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No. XVIII., OF VOL. I., 1937. LONDON, SATURDAY, MAY 1, 1937. Pp. 128—Price 1s.
No. 5931. VOL. CCXXXII. Founded 1823. PUBLISHED WEEKLY. Registered as a newspaper. Annual Subscription: Inland £2 2s. Abroad £2 10s.

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No. 5931 LONDON: SATURDAY, MAY 1, 1937 CCXXXII

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ADDRESSES AND ORIGINAL ARTICLES

THE PREVENTION OF PULMONARY TUBERCULOSIS AMONG ADULTS IN ENGLAND

IN THE PAST AND IN THE FUTURE *

BY P. M. D'ARCY HART, M.D. Camb., F.R.C.P. Lond.
ASSISTANT PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL, LONDON

(*Continued from p. 973*)

THE national tuberculosis scheme was designed at a time when contact with open tuberculosis was considered chiefly dangerous to children. While precautions were advised for adults, doubts as to their necessity were commonly expressed. During the past decade or so, however, more attention has been paid to the risks run by adults, and particularly by young adults. This is evident from the opinions of physicians to the London tuberculosis dispensaries, cited by Bentley (1936c), who points out also that the incidence of new pulmonary cases in London during 1926–35 among child contacts examined was 1 per cent., whereas among adult contacts examined it was 7 per cent.

It is obvious that exposure in some form is more dangerous than no exposure at all, for without exposure there can be no infection; but we should like to know the position of adults facing exceptional exposure to contact, as compared with that of adults encountering exposures of the kind met with in ordinary life. Again, we should like to know whether young adults run a greater risk from exposures than do older persons; and to know the part played by exposure incurred before adult life in the development of progressive lesions later, compared with the effect of exposure encountered actually during adult life. And we should also like to know the comparative risks run by adults who react negatively, and those who react positively, to tuberculin.

What information is available? Of late years much work has been published upon the fate of adults who are facing, or are about to face, *exceptional* amounts of exposure. Among these are home contacts, work contacts, medical students, and nurses.

Adults Exposed to Exceptional Degrees of Contact

HOME CONTACTS

Using their comprehensive scheme of family records, Opie and his co-workers have studied the development of pulmonary tuberculosis in persons of various ages after exposure to contact with this disease in their homes in Philadelphia.

Persons apparently first so exposed to sputum-positive cases at some date after the age of 15 developed progressive lesions more often than persons similarly exposed to sputum-negative cases, and still more often than persons of corresponding age in the general population. The annual attack-rate of manifest—i.e., clinical—pulmonary tuberculosis, in the persons exposed to sputum-positive cases, showed this excess at its maximum 4–5 years after the commencement of the known exposure, while their death-rate showed its maximum excess 2 years later.

With few exceptions these progressive pulmonary lesions in persons apparently first exposed after the age of 15 were of the "adult" type. In exposed children the radiographic incidence of primary lung complexes increased with the length of time after the commencement of the exposure; but in these adults it did not, and from this it was inferred that their adult-type lesions were due to exogenous reinfection acquired, by contact, after the age of 15, in lungs already the site of first-infection (see Opie, McPhedran, and Putnam 1935, Putnam 1936). Since, however, the tuberculin reactions before the commencement of known exposure are unknown we cannot exclude the less likely hypothesis that the adult-type lesions found were due to endogenous reinfection (arising by blood spread) from a first-infection focus that itself was acquired, by contact, after the age of 15. For while the proportion of persons that acquired first-infection during exposure after the age of 15 might have been too small to cause a significant gradual increase in the radiographic incidence of primary complexes, it might still have sufficed to provide the number of adult-type lesions found.

It is clear at least from these valuable observations that exposure in their homes during adult life was an important factor in the production of adult-type progressive pulmonary lesions in these contacts. And more recently these authors have brought forward evidence of the greater danger of this household contact to adults than to children (Opie, McPhedran, and Putnam 1936).

Opie's procedure was, in the main, to identify his families by the primary case and to work forwards from the commencement of known contact. The opposite though more limited method has been used by Lloyd and MacPherson (1936) at the Brompton Hospital. They studied the case records of a series of clinically tuberculous young adults, aged 15–24, so as to determine the time-relationships with the *termination* of known exposure to any earlier case in the home or elsewhere. In 40 per cent. of the patients evidence was found of such an earlier case, the majority (82 per cent.) having been in the home. In 80 per cent. of the young adult patients with evidence of an earlier primary case the onset of their own disease was found to have been either while they were still in contact with the primary case, or within five years of termination of known contact.

This work supports the view that home exposure to clinically recognisable tuberculosis during adolescence or adult life plays a large part in producing tuberculosis among young adults.

THE POSITION OF MEDICAL STUDENTS

The incidence and extent of radiographic adult-type lesions in medical students appears to be greater during their clinical than their preclinical training. Since the students are older during the clinical course, and since the morbidity of pulmonary tuberculosis also increases somewhat rapidly with age among young adults, assessment of the importance of contact depends almost entirely upon comparison with controls of the same age, which are very difficult to obtain. However, comparing medical students with a small series of dental and law students, Hetherington, McPhedran, Landis, and Opie (1935) did find a higher incidence of important adult-type apical lesions in the medical students, suggesting damage from exposure to contact in adult life during their clinical training.

THE POSITION OF HOSPITAL NURSES: INFLUENCE OF PREVIOUS TUBERCULIN SENSITIVITY

The position of adult contacts has so far been discussed without reference to previous tuberculin

* The Milroy lectures for 1937 delivered before the Royal College of Physicians of London on Feb. 18th and 23rd.

reactivity. This aspect of the problem has been investigated in probationer nurses, a fair proportion of whom come direct from rural districts which means that many may be negative reactors on entry. Heimbeck, working at Ullevaal Municipal Hospital, Oslo, found that tuberculin-negative probationers, brought into contact with open tuberculosis during their training, ran a serious risk of developing lesions such as pleurisy, erythema nodosum, and even meningitis, attributable to tuberculous first-infection. These lesions, as might be expected, did not occur so often among those already first-infected, as shown by a positive tuberculin reaction. Hence the original "negatives" were at a disadvantage.

Heimbeck's figures also appear to show that in a given limited time the original negative reactors developed serious adult-type lesions more frequently than did the original positives. These lesions might be explained as due to endogenous reinfection arising by blood spread from a first-infection focus acquired, by contact, during their training. Heimbeck does not discuss this satisfactorily, but he does make it clear that he attributes this second difference between the fate of the originally negative but now positive nurses, and that of the originally positive nurses, to the previous possession of specific immunity by the latter but not by the former. Hence the original negatives appear again to have been at a disadvantage. He supports his view by citing the fate of nurses who became tuberculin-positive as the result of B C G immunisation. This was much the same as the fate of those who were originally positive without artificial immunisation.

It should be noted that the cases of manifest disease described by Heimbeck among the originally tuberculin-negative nurses of his series occurred within a year of their becoming positive, the latter change having usually taken place by the third year of their training; but for those who had not manifested the disease within one year of the change from negative to positive the subsequent fate was no different from that of the originally positive reactors (see Heimbeck 1936).

The appearance of troublesome accompaniments to tuberculous first-infection in nurses who are negative reactors to tuberculin before their training, as found by Heimbeck, has been confirmed by several authors. One of these (Mariette 1936) has also provided tentative confirmation of the greater risk of the adult type of disease appearing in this group than in the group of originally positive reactors. This second difference in fate is, however, in conflict with Opie's experience with medical students, among whom no correspondence was found between the occurrence of adult-type lesions and the original tuberculin reactivity; nor does it agree well with Opie's interpretation of the adult-type lesions in his home-contact series as being due to exogenous reinfection (see above). No final conclusion, therefore, can be reached until more information is available.

A somewhat obvious suggestion as to the arrangement of the results of work on this problem may be made here. It is best to compare the fate, in a given period, of the originally positive reactors *not* with that of *all* the originally negative reactors, but with the fate of those originally negative reactors *who have become positive* as a result of exposure. In Heimbeck's work this would make no difference to the figures, since all his negative reactors changed to positive within three years of commencing exposure during their nursing training; but, since such a change of reactivity does not take place so completely in all hospitals, the two above methods of comparison are not necessarily identical.

Protection of Young Adults Exposed to Exceptional Degrees of Contact

The following three principles might reasonably be adopted for averting the possible danger to adults who are, or are about to be, subjected to known and perhaps intense or frequent exposure to open tuberculosis.

(1) Known exposure to contact in adult life, both of tuberculin-positive and of tuberculin-negative persons, should be reduced to a minimum. (In the near future this opinion may have to be modified to lay special stress upon *young* adults, and especially on negatively reacting young adults.)

(2) Adults, both tuberculin-positive and tuberculin-negative, who are known to be in contact with open tuberculosis should be kept under observation during the period of exposure. (This opinion also may have to be modified to lay special stress upon young adults, and especially young adults whose tuberculin reactivity is known to have changed from negative to positive as a result of the exposure.)

(3) After the termination of the known exposure, such observation of adults (except perhaps those who have retained their negative reactivity) should be continued for some years.

How can these principles be embodied in practice in the near future? The following remarks are restricted to young adults in the category under consideration—namely, home contacts, work contacts, medical students, and hospital nurses.

PRACTICAL MEASURES

For *home and work contacts* protection, both of positive and of negative reactors, from the source of potential infection is likely to remain the main policy with young adults, as it is with children; though of course it may unfortunately happen that this source, whether in the home or at work, is only discovered after one or more secondary cases have already occurred. Such protection of young adults, like that of children, will become increasingly effective as more expeditious diagnosis and removal of sputum-positive cases for residential treatment becomes practicable, as the sanatorium segregation of the persistent sputum-positive case becomes more widely practised, and as further advances are made in the schemes of after-care so as to reduce the contagion of sputum-positive patients and so as to minimise their chance of relapse into this infectious state. Incidentally, such measures would help to meet the growing objection of employees to the presence of an infectious fellow-worker.

Here I may mention the growing interest in the earlier recognition of infectiousness among persons with apparently minor lesions in the lung. This mainly turns upon the technical advances in sputum examination, such as concentration of organisms, examination of stomach contents, improved methods of culture, and examination of "morning saliva" (see Holmes 1936).

For *medical students and nurses*, protection from known sources of potential infection by complete avoidance of exposure is clearly unattainable. The most that can be expected is the reduction of exposure to the minimum by hygienic measures, though these are perhaps more difficult to carry out in general hospitals than in special tuberculosis institutions (Joint Tuberculosis Council 1936).

If Heimbeck is right, however, we must be prepared to regard negative tuberculin reactivity in young adults exposed to contact with open tuberculosis as indicating *special* disadvantages—namely, the risk of clinical accompaniments to first-infection and a greater risk of progressive adult-type pulmonary

lesions later. Special steps may therefore have to be taken for the protection of negatively reacting students and nurses, particularly if the proportion negative at the commencement of clinical training should increase.

One suggestion is to refuse negative reactors. This course would be harder to follow with students, who would already be half-way through their training, than it would be with nurses, but even with nurses a continuation of the present shortage of applicants for posts at many tuberculosis institutions would create considerable difficulties. If it were decided eventually to follow such a drastic course with medical students, the unfortunate man in his third year of study would be compelled not only to pass an examination in intellectual capacity to the satisfaction of the anatomists and physiologists, and to pass a test of mental fitness to the satisfaction of the industrial psychologists, but also to pass a tuberculin test to the satisfaction of the immunologists.

A less drastic though hardly more practicable suggestion for the protection of those tuberculin-negative probationer nurses who train at a general hospital is that they should avoid the tuberculosis ward, if such exists, until their reactivity has changed to positive.

A third and much more promising suggestion is to vaccinate these nurses with B C G, not allowing them to be brought into contact with cases of tuberculosis until their reactivity has changed to positive. The reports of recent investigations upon B C G vaccination of tuberculin-negative infants (Wallgren 1934, Kereszturi and Park 1936) and nurses (Heimbeck 1936) have been distinctly encouraging.

Adequate observation, including periodic examination, during and for some years after the period of exposure (see Jessel 1930, Lloyd and MacPherson 1936) should help to reveal such progressive pulmonary lesions as do develop in spite of all protective measures. The methods of carrying out such periodic examination will be discussed later.

The Contacts of Ordinary Life

Measures to reduce the amount of contact with infectious cases, together with improvement in housing and hygienic conditions, may be expected to increase the proportion of children who reach adult life without becoming tuberculin-positive. If a negative reaction in a young adult should come to be regarded as entailing a special risk in the face of exceptional exposure, the question would arise as to the risk run from exposures met with in the ordinary circumstances of life.

This has been the subject of considerable speculation. Indeed, it has already been suggested (Dahl 1933) that the recent retardation in the decline of pulmonary tuberculosis mortality among young adults in this country has been partly due to an increased incidence of negative reactivity at this age, with a corresponding reduction in immunity. Such an explanation is, however, disputed by Bradford Hill (1936), and would be untenable if, as appears possible, the decline in mortality in this age-group is once more being resumed. As a matter of fact, little is known of the present degree of tuberculisation of young adults of the urban working-class population of England, and still less of those of its rural districts. Certainly there seem to be insufficient grounds at present for any special action to protect negative reactors in particular in the population at large under the ordinary circumstances of life. Nevertheless, lest such a possibility be deemed fantastic, I may cite the procedure in recruiting for the Japanese navy, where, I am informed, only positive reactors to tuberculin are accepted for service.

As to the future, we may hope that any danger of producing a large proportion of adults in the general population who would be open to the risks incurred by peoples living under primitive conditions will be offset by the fewer and smaller doses of infecting bacilli likely to be encountered, by a higher standard of living of the people, and possibly also by artificial active immunisation.

At the same time it is important to have records of the changing tuberculisation of young adults, and its relation to changing morbidity and mortality. In particular, we shall do well to keep a watch for the development of classes or areas with a high incidence of adult negative reactors and a low incidence of pulmonary tuberculosis cases, and other classes or areas where the opposite holds, in case the movement of persons from one class or area to another may prove important, epidemiologically.

Conclusions Concerning Contacts

Contact with open tuberculosis has its dangers in adult life as well as in childhood, and much of the interest in the infectiousness of this disease is rightly being transferred from children to young adults. Preventive action in the future to protect adults known to be in contact with open tuberculosis is likely to aim—more than at present—at limiting the exposure, at increasing individual resistance, and at maintaining close observation for the early detection of progressive lesions. Those who react negatively to tuberculin may require special protection; they may need particularly close observation should their reactivity change to positive as a result of the exposure; or they may require artificial immunisation. By a combination of preventive measures such as these with the more general social measures discussed earlier, we may confidently hope that the benefit to the community from reduction in the unfavourable *consequences* of tuberculous infection will far outweigh any harm from loss of immunity resulting from its diminished *occurrence*

(To be concluded)

THE RATIONALE OF CERTAIN METHODS USED IN PHYSICAL TREATMFNT *

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THE range of radiations that includes gamma rays, X rays, ultra-violet and infra-red light, and the high-frequency electric waves used in broadcasting forms one great continuous spectrum of electromagnetic waves. The various regions of this differ only in wave-length, the gamma rays being inconceivably short and those used in radio being many metres long. Still shorter even than gamma rays are the cosmic rays that come from the universe with great penetrating power and knock electrons off the living substance of our bodies, with what effect, if any, we do not know.

Radium

Radium emits (*a*) alpha particles or rays, which are helium nuclei projected at high speed, and are

* A lecture given at the St. John Clinic and Institute of Physical Medicine on Feb. 5th.

completely absorbed in passing through the thickness of an ordinary sheet of paper; (*b*) beta particles, or rays, which are electrons travelling at high speed and are stopped by 1 mm. of lead, or 0·5 mm. of gold or platinum; (*c*) gamma rays, which are photons with an average energy higher than that of X ray photons; those of the highest energy can traverse many centimetres of lead.

The X rays are generated at voltages from 10–1,000,000 kv, a range of wave-lengths extending from 2 to less than 0·05 A. (Angstrom units = 10^{-7} mm.). The action of the soft X rays can be compared to the beta rays of radium and that of the hard with the gamma rays.

At first it was thought that rays of different qualities were capable of producing different kinds of reactions, but it is now known that the erythema-producing effect on the skin does not differ whether caused by gamma or by hard, soft, or very soft X rays. Difference in magnitude of reaction is due to the relative amount of energy absorbed per unit volume of tissue. With equal amounts absorbed in equal volumes of living substance the effects are the same regardless of the penetrating power of the rays. Thus gamma and X rays produce similar changes in the chromosomes of the nuclei of ova and similar mutations may arise—e.g., in the fruit-fly drosophila. Dividing cells are those most sensitive to radiation, and in producing an effect the rate at which the rays are absorbed is very important. When a beam of high intensity is absorbed the extensive ionisation initiates destructive changes in all the cells; on the other hand, the slight damage done by a beam of low intensity can be repaired, and there may be no result. Hard rays under appropriate doses may injure the more sensitive tissues and leave others unharmed. Thus by gamma rays of low intensity the seminal epithelium alone is injured; with high intensity the entire testis degenerates.

The erythema reaction of the skin is not a good test of radiation. Minute living cells such as the ova of drosophila or of the axolotl are much better, failure to hatch out being the index. The very small penetration of soft X rays and of ultra-violet rays must be borne in mind. The radiation of one, or of both kinds of germ cells, before fertilisation may result in the production of monsters. Applied to developing organisms irradiation effects the most rapidly growing systems such as nervous, vascular, reproductive, and renal. Irradiation inhibits processes of regeneration in invertebrates in which processes there is taking place active division of cells. Ultra-violet rays are much less effective than very low voltage X rays or cathode rays.

Repeated X ray irradiation of the skin swells the connective tissue bundles, destroys cells, and thickens the cutis with shrinkage of the skin. Similar changes occur in the walls of the blood-vessels, leading to occlusion; the epidermal cells swell and show abnormal mitosis. Necrosis in the superficial layer of the cutis and proliferation in the epidermis takes place, and depilation may result. Ultra-violet, gamma, and X rays alike produce dilatation of vessels, stasis, diapedesis, and œdema. Similar intensity of the visible rays alone do not produce such destructive effects on the skin. In frost-bite the rapid loss by radiation produces the same sort of damage as heat-burn does.

Exposure of the body to a massive dose of X rays or radium, or the intravenous or oral administration of a large dose of thorium or radium salts or of radon, alike produce destruction of marrow and lymphoid tissue, leucopenia, degeneration of epithelium, hyperæmia of the intestines, cellular degeneration of organs, and desquamation of epithelial linings, &c. Infra-red rays produce flushing of the skin at the time of exposure, ultra-violet rays after a latent period of one hour or more. For X rays the latent time is 2–5 days, and for the gamma rays of radium 2–3 weeks. The length of latency indicates the time that secondary changes take to appear in the living cells.

EFFECT OF WEAK DOSES

The giving of salts of radium by the mouth or by injection is dangerous. If taken by the mouth damage may be done to the mucous membrane of the intestines, especially if the patient is constipated. When injected 80 per cent. may be retained in the tissues, principally in the bone-marrow, disappearing very slowly. Thus deposits are formed from which radiation may be emitted for a long time. A single dose of radium salts equivalent to 0·5 mg. of radium element can prove fatal. Several women died through licking brushes when applying a luminous radium paint to the dials of watches. The amount found in their bodies varied from 0·01–0·08 mg. A rich American citizen died through repeatedly taking, in order, as he thought, to rejuvenate himself, a solution containing 0·001 mg. of radium and meso-thorium per ounce of water. The activity of the emanation of radium declines to a half in 3·85 days, and falls to less than 1 per cent. in a month. When taken by the mouth 90 per cent. is given off by the lungs in an hour, and so very little stays in the body to form an active deposit. It is soluble gas and when absorbed may reach every tissue, wherein in consequence there will be a free action of the alpha rays; this is not the case when radon is applied in platinum or other containers, which exclude these rays.

THERAPEUTIC USES

The unit of radon is a millicurie, the amount of gas in equilibrium with 1 mg. of radium element. For weak concentrations the Mache unit (M.U.) is used, 2,500,000 of which equal 1 millicurie. Some spa waters are radio-active—e.g., Joachimsthal with 600 M.U. per litre and Baden-Baden with 100 M.U. Artificial radio-active waters are prepared generally with 8–30,000 M.U. in 1 litre as the daily dose. In rats continual inhalation of radon in high concentration caused loss of weight, with leucopenia, enlargement of spleen, hæmorrhages of the lungs and glandular atrophy. It is claimed that small doses have a stimulating effect upon cell activities and are inimical to morbid states. There is no statistical evidence that spas with a high content give better curative results than spas with a low one.

In a series of cases of chronic arthritis and hyperpiesia treated with a concentration of 80,000 M.U. in 15 oz. of water by Howitt, Pillman-Williams, and Russ (1937) no benefit other than subjective was found in the clinical condition, while no injurious results were noted. There is no evidence that the small quantity of radio-active material in certain electrically heated pads is useful.

In a series of in-patients treated with much larger doses—2,500,000 to 10,000,000 M.U. in 10 oz. of water—no improvement was noted, except in two cases of chronic gout; more requires to be done to confirm the effect observed even in these two cases. The red cells fall in number when large doses are given, a sign that the treatment is risky. We must bear in mind that cancer of the lung occurs to a high degree in miners who extract pitchblende, the ore from which radium is obtained. Workers in X rays or radio-active substances suffer from dermatitis,

particularly those who come in contact with tar or paraffin, and skin cancer may result. They also suffer from anæmia and leucopenia and necrosis of the jaw bone. Sarcoma has resulted from a radon tube left in the body. In handling radium lead or tungsten alloy screens must be used, and the period of work made short.

It has been shown recently that the two principal chemical systems of cell life that supply energy—respiration and glycolysis—are differentially attacked by gamma radiation applied at body temperatures. Thus tumour cells lose their power of using oxygen during a period when glycolysis remains unaffected, but if the tissues are cooled to 10° C. or lower the reverse happens. Normal tissues unlike tumour cells do not use glycolysis as a source of energy, except in a minor degree. When the utilisation of carbohydrates by oxidation or by splitting processes is inhibited by gamma radiation, nitrogenous products, probably proteins, are broken down to supply energy to the partially damaged cells (Crabtree 1936).

Glyoxalase, a ferment which was supposed to be important in the series of reactions which result in formation of lactic acid in cells is resistant to gamma radiation. If a rat tumour is irradiated with a dose too small to visibly affect it, and seven days later the immediate subsequent transplantation of this tumour is irradiated, and so on, the effect becomes cumulative. The rate of growth and the percentage of successful inoculations falls off (Cramer 1936). Such a small dose then is harmful, not stimulating to tumour cells.

Ultra-Violet Light

The short ultra-violet rays penetrate so slightly that their effects are limited to the epidermis and superficial capillary loops of the cutis. The absorption of products of the damaged cells causes a flush first in evidence some hour or two after exposure. The skin next day is sharply reddened; a section of it shows that leucocytes have infiltrated among the cells of the superficial layers; granules appear in the cells round the congested capillaries. In thirty hours the reaction is increased, nuclei of the superficial cells stain dimly, and degenerated cells are to be seen. The pigment layer is disturbed and here and there the cutis is separated from the epidermis. The reaction now subsides, but the greatest swelling of the connective tissue cells is seen on the third day. The inner layer of the epidermis pigments as it and the blood-vessels return to normal. The outer layer desquamates.

One of the most important actions of the ultra-violet rays is the production in the skin of vitamin D. The vitamin is produced by activation of ergosterol, present in minute amounts in the sebum. This is brought about by the shortest wave-lengths of sunlight of about 2900 A. These are absent in winter and screened off by smoke pollution in cities. Rickets can be prevented by suitable exposure of the skin of infants and children to the sun or arc lights. Vitamin D is also obtained by eating food such as eggs, fish, and particularly liver oil, halibut oil being especially potent. It is formed by the action of the sun on green food of both land and sea. The milk of cows contains the vitamin when they are fed on grass, not when they are stall fed on oil cake and grain. Some animals secure this vitamin by licking or preening their fur or feathers, and carnivora by eating fur or feathered animals. Vitamin A is synthesised in animals from carotin, a common pigment of green plants, carrots, &c. The B vitamins are plentiful in green plants but even more so in yeast grown in the dark. The antiscorbutic vitamin C is developed not only in green plants but in citrus fruit and in germinating seeds; certain animals, such as rats, can produce it in their own bodies. Vitamins are destroyed by ultra-violet rays, but not by that brief exposure that is required to form vitamin D.

THERAPEUTIC USES

The antirachitic effect of ultra-violet light is exerted by rays at 2530–3000 A. and very weakly by those at 3130 A. The amount of energy of the shortest wave-length in sunlight—about 3000 A.—which is effective in preventing rickets is always very small. Infusoria are killed about three times as quickly with rays at 2800 A. as with those at 3000 A., while those at 3130 A. have no effect. Hæmolysis is most active at 2530 A. Erythema of the skin is produced by 2900–3000 A. and also by 2530 A. where there is a strong line in the mercury arc spectrum. These latter rays penetrate the epidermis less deeply than the 3000 A. rays of sunlight, and the resulting pigment is in consequence lighter in colour; thus the sun browns the skin best. Patients who do not pigment well, such as red-haired, freckly people, have to be exposed to sun treatment with care. Protection against ultra-violet light is secured by thickening of the horny layer, and by pigmentation of the epidermis. By giving doses that produce a mild erythema once a fortnight, time is given for the erythema and desquamation to pass off, and the skin again becomes sensitive. The body can be treated in four parts, thus if treatment is given twice a week, exposure of any one part is given once a fortnight. By this plan the length of exposure can be kept short, for if the whole body is exposed each time the skin becomes less and less sensitive, and to produce an effect the exposure has to be made longer and longer.

Health is stimulated by suitable doses of ultra-violet rays, and immunity is said to be increased against staphylococcal infections. Overdoses cause fever, irritation, and depression, and are dangerous to those who are fighting an active tuberculous infection. The doses for such patients must be small and carefully adjusted. The effect of absorption of products of sunburn from the skin may be compared with those of protein shock produced by injection of milk or of the patient's own blood. Ultra-violet irradiation is one of the best means of producing counter-irritation, and blistering doses prove very useful in the treatment of sciatica, &c. The irradiated skin is covered with Elastoplast bandage and left untouched till healed (Eidinow 1937).

Intense doses given by the water-cooled mercury lamp, or the water-cooled arc used in the Finsen Institute heals lupus vulgaris by producing a reaction in the skin. Light treatment is also valuable for alopecia areata, eczema, psoriasis, acne, boils and carbuncles, erysipelas and septic wounds, surgical tuberculosis, and for wasting and rickety children. It stimulates breeding in birds, mice, and monkeys, and no doubt also in man. Good pigmentation of patients is thought by A. Rollier to be a sign of well-being, and for wounds Oscar Bernhard, the pioneer in this form of treatment, uses the Alpine open air and sunlight.

Infra-Red Rays

The penetrating infra-red rays are of particular value in addition to the ultra-violet rays—for there seems to be no antagonism between ultra-violet and heat rays. These penetrating rays relieve pain in cases of sprain, &c., and by softening and making supple rheumatic tissues enable curative movements

and massage to be carried out. The long infra-red rays are absorbed by the surface of the skin and do not penetrate; they may raise the superficial temperature from 32 to 41–44° C., while the temperature 10–25 mm. below the surface is not raised more than a degree above body temperature, and then only by conduction of heat. The temperature of the surface rises quickly to a maximum, and quickly drops when the irradiation ceases. On the other hand, the short infra-red and red rays by penetrating may produce a rise to 40° C. 25 mm. below the surface, while the surface is raised only to 38°. In this case the maximum rise and fall are reached more slowly; there is a drop of temperature from within outwards, and this is accompanied by a feeling of refreshment and relaxation. After insolation has ceased the surface of the skin quickly falls in temperature, but the deeper layers may take three-quarters of an hour to fall. With the putting on of clothes after insolation the effect may last for hours.

The heating of the blood and subcutaneous tissues by the short infra-red and luminous rays is one of the most important of curative effects (Sonne 1921). Pigment in the epidermis absorbs and transforms all the rays of sunlight into heat, and this in its turn excites the nerve-endings and evokes sweating; thus overheating is prevented. A negro owing to his pigment can have a thinner skin and so lose heat more easily.

It must be kept in mind that infra-red radiation that will not go through a thin layer of water will not penetrate the epidermis. Thus only 0·5 per cent. of the rays from a dark heater, 15 per cent. of those from a carbon arc, and about 30 per cent. of those from a tungsten arc and from the sun penetrate 1 mm. of flesh. Oiling the skin by diminishing the scattering of the rays increases the penetration of the short infra-red and visible rays. The value of a tungsten arc no doubt depends in part on the greater number of penetrating rays coming from this source. Sonne found during irradiation with the highest endurable intensity that the surface skin temperature rose to 43·8° C. with visible and to 45·5° with the longer infra-red rays. With visible rays a maximum temperature at 5 mm. depth was then 47·7°, and with longer infra-red rays 41·7°. The amounts in gram-calories per sq. cm. per minute, which could be borne by the skin, was 3·11 for visible, 1·79 for shorter, and 1·33 for longer infra-red rays. The visible rays, except the red, are absorbed by the blood in the cutis, and warm this; the heat is then circulated over the body. How the red and short infra-red rays penetrate beyond the cutis is seen on placing a glow lamp in the mouth and standing in front of a mirror in a dark room. A red glow comes right through the cheek, it does not do so in the case of a negro, and only to a small extent in the case of a Japanese.

I find that the long infra-red rays from dark or dull red sources acting on the skin reflexly congest and narrow the airways of the nose and lungs, an effect which is set aside by cooling the skin with a fan and in some people by rays from bright sources—the antagonistic rays are in the short infra-red region. The stuffiness felt in rooms heated by dark or dull red sources is due to the action of the rays on the skin, and the reflex action on the air tubes and nasal sinuses, and has, in my view, nothing to do with the chemical purity of the air. All rooms so heated should be ventilated with enough cool air to set aside the stuffiness. A greenhouse heated by the sun feels stuffy compared with the open air, because the sunlight is absorbed by the objects within and turned into dark heat, and this is trapped by the glass, while there is no movement of cool air.

For infra-red treatment bright sources are best, those which give off the more penetrating rays—e.g., 1000 watt electric bulbs fitted with concave mirror reflectors, or the clinical gas lamp. Eidinow's "daylight" lamp gives relatively weak ultra-violet rays coming from a tubular mercury-vapour arc run at low tension, together with plenty of infra-red rays from a number of incandescent lamps, and it is a very effective method of treating the whole body, as near to that of sunlight as possible.

While ultra-violet rays burn superficially, heat may burn deeply; such a burn must be treated with tannic acid solution, which forms a sterile cover of coagulated protein. Heat brings blood and lymph to treated parts and softens the tissues; increased circulation and tissue metabolism has a curative effect on painful parts in cases of strain and rheumatism. One of the best methods of applying heat is by the paraffin-wax bath, heated to 130° F. The paraffin solidifies at skin temperature and forms a glove on the submerged part, which protects from overheating, the vapour of sweat under the wax glove acting as an insulator. The result is a local steam bath, the part becoming flushed with blood and raised in temperature. The body temperature may be raised to 102° F. by immersion of the legs above the knees. To chilblains, aching feet, and rheumatic joints the paraffin bath gives great relief.

Short Waves

Beyond the infra-red is the high-frequency radiation used in radio. The modern short-wave vacuum tube oscillator has allowed a study of electric waves as short as 1 metre; it is not as yet possible to generate any intensity of wave-lengths less than this. With waves of 100–1 metre wave-length or 3–3000 million cycles per second, and the living tissue put in the field between condenser plates, and so subjected to electrical stress, a displacement current results, in which electrons in the molecules are stressed first in one direction and then in another. Any free electrons also tend to pass from molecule to molecule, forming a conduction current, and the molecules themselves, if bi-polar, tend to rotate in response to the changing potential of the field. The result is heating of the tissues. Artificial fever can thus be produced by putting the whole body, with exclusion of the head, in the field of the high-frequency current. The temperature may be raised to 105° F. in 60–80 mins. By so heating the body for some hours gonococcal infection is destroyed. General paralysis of the insane has been treated successfully by this method in place of artificial production of malaria.

Local heating can be produced by the local application of the electrodes—e.g., on either side of the face; the temperature in the mouth thus being raised to 102–103° F. an effect that cannot be produced by hot bottles placed on either cheek, or by ordinary diathermy. A local heating of the rectum can similarly be obtained. Small tumours grafted in the flanks of rats can be destroyed by the heating effects of the field, with some damage also to the skin. There is no evidence of any specific effect apart from heat, for heart, cilia, and muscle-nerve preparations of the frog put in the field and kept cold suffer no change. If they are not kept cold they become affected by rising temperature, brought about by the high-frequency field just as when heated by any other means. By intra-pelvic diathermy heat treatment may be given with great advantage to certain cases

of inflamed cervix or prostate, especially in gonorrhœal infection, and backache and rheumatic troubles may also be relieved (Robinson 1929). In such case the heat brings more blood and lymph to the treated part, and increases metabolic change, and so produces a curative effect.

Natural Sources

Exposure to cold in open-air treatment is effective in stimulating body metabolism and appetite; still more so sea bathing, for the resting metabolism may be increased by 50–100 per cent. in children exposed to the open air, and 10 times while bathing in the sea. Cold stimulates the nervous system and drives the blood inwards, while heat flushes the skin. Such to and fro changes promote health. It is of interest to note that sterility has been produced experimentally by keeping the testicles warm all the time. The breathing of cool air promotes evaporation from the respiratory membrane and stimulates secretion and the flow of blood, thus cleansing the membrane. The secretion of the membrane is a defence against infection; cold air widens the breathing tube, stimulates body activity, and causes deep breathing, which occasions a natural massage of the abdominal organs.

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ADDISON'S DISEASE DUE TO SUPRARENAL ATROPHY

WITH PREVIOUS THYROTOXICOSIS, AND DEATH FROM HYPOGLYCÆMIA

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THE patient, a single woman, was first seen on August 28th, 1929, when she was 30 years of age. At that time her history was that weakness, loss of weight, prominence of the eyes, and swelling of the neck had developed during the last three years. She was a well-developed woman (height 5 ft. 4 in.; weight 9 st. 8 lb.) presenting the characteristic signs of thyrotoxicosis. Her basal metabolic rate (B.M.R.) of +42 per cent. having confirmed this diagnosis, she was referred for X ray treatment of her goitre.

On Nov. 6th of the same year, having had three exposures to X rays, she weighed 10 st. 3 lb. and the tremors and vasomotor disturbances had disappeared, but exophthalmos remained. The B.M.R. was now +18 per cent. On April 8th, 1930, after two further exposures to X rays, her improvement was maintained, and the thyroid gland was no longer palpable. Her weight was now 10 st. 4 lb. and the B.M.R. +20 per cent.

She was not seen again until Jan. 19th, 1936. In the interval she had resumed her work as a typist, and had remained in good health until 1935.

During the summer of that year she had become very sunburnt; the pigmentation did not fade subsequently, but rather increased; and in September she had a severe attack of colicky epigastric pain, accompanied by vomiting, pain in the back, and swelling of the eyelids. She returned to work however, and between September, 1935, and January, 1936, she felt quite well, although she was rather easily tired, and the pigmentation of the skin persisted.

In January, 1936, she began to have attacks of pain and a sinking feeling in the stomach, accompanied by nausea, these symptoms lasting for a few days at a time. She also developed an aversion to salt or food the least bit salty, and was more sensitive to cold weather than before. When she was seen on Jan. 19th the pigmentation of the skin was striking. It was brown in colour, and present on the face, lips, backs of the hands, areolæ, and axillæ. She now weighed only 8 st., but otherwise physical examination revealed no abnormality. The pulse-rate was 68, the blood pressure 120/90 mm. Hg, and the B.M.R. −21 per cent. The blood chemical findings on this occasion were: blood-urea 37 mg. per 100 c.cm., fasting blood-sugar 62 mg., and plasma chloride (expressed as sodium chloride) 511 mg.† The urinary chlorides in a sample taken at the same time as the blood sample were 480 mg.

A diagnosis of subthyroidism was made, and also a tentative diagnosis of Addison's disease, in view of the pigmentation, loss of weight, gastro-intestinal symptoms, and slightly subnormal plasma chloride level. The patient was put on thyroideum siccum (B.P.) one-quarter of a grain daily, the small dose being given in view of the sensitivity of patients with Addison's disease to thyroid extract. Her symptoms, after a short remission, became severe again, and she was admitted to hospital on Feb. 26th, 1936, thyroid administration being stopped.

FIRST STAY IN HOSPITAL

The pigmentation had now become deeper, being present over the abdomen and in the skin creases of the palmar surface of the hands. Her weight was only 7 st. 2 lb., her pulse-rate was 104, and her blood pressure 88/64 mm. Hg. Blood-urea 40 mg. per 100 c.cm., fasting blood-sugar 65 mg., and plasma chlorides 526 mg.

As her symptoms were not considered of extreme urgency, she was at first kept under observation with no special treatment, the blood chemistry being examined daily. There was a slight improvement in subjective symptoms during the first five days after admission, but the plasma chloride level declined slowly, as is shown in the Figure.

On March 1st menstruation began, and the flow lasted for four days, no blood samples being taken during this time. On the 6th, two days after the period had ceased, the patient complained of nausea, and began to vomit after meals; the plasma chlorides showed a further fall.

On March 9th her temperature rose to 101° F., and she developed dull abdominal pain, accompanied by tenderness but no rigidity. As the plasma chlorides had fallen to 479 mg. per 100 c.cm. the blood-urea had risen to 67 mg., and the blood pressure had fallen to 70/50 mm. Hg, treatment with suprarenal cortical extract was begun, 5 c.cm. of Supracort (Paines and Byrne) being injected intravenously twice daily. No intravenous salines were given at this time, but an attempt was made to commence sodium chloride therapy by mouth. However, the patient vomited salt given in formolised gelatin capsules, and this treatment was abandoned temporarily after one day.

In spite of the hormone injections, the plasma chloride continued to fall for three days, being 438 mg. per 100 c.cm. on March 12th. The subjective symptoms improved however, and the blood pressure had risen to 94/66 mm. Hg by the 12th; the fall in plasma-chloride concentration for three days

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† *Note on Methods.*—Chloride estimations were made on plasma throughout by the method of Van Slyke and Sendroy (1923). Blood samples were collected without stasis, but not under oil, in small sample tubes which were practically filled with blood; separation of plasma and analyses were performed at once. Blood-urea and blood-sugar estimations were made by the method of Maclean.

after hormone therapy was probably due to dilution of the blood, following hæmoconcentration during the crisis, although no confirmatory hæmatocrit estimations were made. That such dilution occurs after hormone therapy in suprarenal insufficiency is recognised from the work of Swingle and Pfiffner (1933), Harrop (1933, 1936), and Loeb (1933).

On March 13th the plasma chlorides had increased to 502 mg. per 100 c.cm. and next day salt therapy was begun again, the patient taking 2 grammes of sodium chloride in a cup of water thrice daily. This method of giving salt caused much less nausea than the formolised gelatin capsules, a fact noted also by Kepler (1935) in recording the treatment of Addison's disease at the Mayo Clinic. Hormone injections were discontinued on March 14th, and the patient was now receiving 6 g. of sodium chloride daily as the only special treatment. She was feeling very much better now, and was eating food with relish. As her plasma chlorides only just reached a normal level and began to decline again, the dose of sodium chloride was increased to 8 g. daily, but this did not prove sufficient to raise the plasma chlorides to normal, and the dose was further increased to 10 g. daily. The plasma chlorides quickly rose to normal on this second increase in the dose of salt and continued there during the rest of her stay in hospital, and the patient noted a definite improvement in her symptoms. Her strength and appetite both improved, and she was now able to walk round the ward. The cutaneous pigmentation decreased in intensity, and her weight, which had fallen 2 lb. since admission, began to rise.

To test the observation made by Blankenhorn and Hayman (1935) that other sodium salts could be substituted for sodium chloride without detriment in the treatment of Addison's disease, on March 25th the patient was taken off sodium chloride alone, and given 4 g. each of sodium acetate, sodium bicarbonate, and sodium chloride thrice daily, this being equivalent to 10 g. of sodium chloride in sodium content. This treatment was continued for five days, during which the plasma chlorides fell slightly, but kept well within normal limits (see Figure) while the subjective condition remained unchanged, thus providing a confirmation of Blankenhorn and Hayman's work.

During her stay in hospital, the patient showed a strong tendency towards fasting hypoglycæmia. The fasting blood-sugar readings were :—

Jan. 19th	..	..	62	mg. per	100 c.cm.
Feb. 27th	..	..	65	,, ,,	,,
,, 29th	..	..	77	,, ,,	,,
March 9th	..	..	113	,, ,,	,,
,, 10th	..	..	67	,, ,,	,,

Radiography of the abdomen revealed no evidence of calcification of the adrenals. The lungs were radiologically normal, and there were no signs of tuberculosis elsewhere in the body. The B.M.R. on March 21st was −27 per cent. The patient was discharged on April 1st, having been given instructions to take 10 g. of salt daily.

SECOND STAY IN HOSPITAL

About a fortnight after leaving hospital on April 1st the patient began to suffer from stiffness, and later pain, in her knees, worst at night and in the morning. Otherwise her health was satisfactory and she took her salt regularly. During August and September she received thyroideum siccum (B.P.) gr. 1 twice daily. She had no vomiting or abdominal pain, but her appetite deteriorated. On readmission on Oct. 5th the pigmentation was somewhat lighter than before; the pulse-rate was 84, and the blood pressure 105/78. Both knees were held in semiflexion, and movements were slow owing to spasm of the quadriceps and hamstring muscles. Coarse joint crepitus was felt on movement, which was painful. A radiogram showed typical early osteo-arthritic changes in both knees, but it was agreed that the joint changes could not be held responsible for the extreme degree of spasm present. The patient had always been a difficult nursing case, but her irritability and intractability had now much increased.

On the morning of Oct. 10th, five days after admission, she became drowsy and confused. The spasm of the leg muscles had increased, and the feet were held rigid in an inverted position with the toes hyperextended. This spasm spread to the arm muscles, masseters, sternomastoid, and respiratory muscles; it was tetanic, with occasional superimposed twitches. The patient was semiconscious, responding only to painful stimuli, and her systolic blood pressure was 65 mm. Hg. No cortical extract was available, and 10 c.cm. of 10 per cent. calcium lævulinate solution had no effect on the spasm, which increased in intensity. The blood chemical findings, received about two hours after the first appearance of the spasm, were: blood-urea 34 mg. per 100 c.cm., plasma chlorides 536 mg., blood-sugar, no reducing substance present. As the peripheral veins were so collapsed that intravenous injection was impossible, 100 c.cm. of 50 per cent. glucose solution was administered by nasal catheter, and 8 minims of 1/1000 adrenaline solution injected intramuscularly. The patient, who was deeply comatose by this time, showed a dramatic response to this treatment. Within 25 minutes of receiving the glucose she regained consciousness and complained of great pain in her knees. Instructions were given to continue treatment with glucose and fluids by mouth. In the early afternoon she was able to talk to her relatives but later in the day she became drowsy and relapsed into coma. Adrenaline was injected without effect and she died that night.

POST-MORTEM EXAMINATION

There was *atrophy of both suprarenal glands*, with hyperplasia of the lymphoid tissue of the bowel, and to a less extent of the lymph nodes throughout the body.

Both suprarenal glands were reduced to small flattened pieces of tissue; the left gland measured only 40 by 22 by 1·7 mm. The capsule and superficial arteries were clearly seen. Microscopically, the glandular tissue had disappeared, and only a few scattered cortical cells remained. Some of these showed proliferative activity and contained two nuclei, while others were necrotic and undergoing degeneration. The reticulum of the medulla with its blood sinuses could still be made out, but only one or two medullary cells were seen. The place of the glandular tissue of cortex and medulla was taken by a small amount of fibrous tissue, which was heavily infiltrated with lymphocytes, amongst which there were a few macrophages and plasma cells.

The *thyroid gland* was of moderate size. Microscopically, it showed extensive degenerative changes, with accumulation of lymphoid tissue, an extensive fibrosis of the stroma, and thickening of the walls of the blood-vessels. Residual nodules of thyroid tissue remained, these being composed of small acini lined by a single row of cubical epithelial cells, many of which contained pyknotic nuclei and were in the process of degeneration. Most of the acini contained a small amount of deeply staining colloid. The liver showed fibrosis of many of the portal spaces, which contained giant-cells, and were surrounded by a ring of lymphocytes. Some of the liver cells towards the central vein showed degeneration, and had pyknotic nuclei.

The *parathyroid glands* appeared normal.

Permission to examine the head was refused, so that the pituitary gland could not be examined.

Discussion

Cases of Addison's disease associated with thyrotoxicosis have only rarely been reported (Etienne 1910, Etienne and Richards 1926, and Chauffard and Girot 1925, and Brenner 1928–29). As in the present instance, the symptoms of Addison's disease have usually followed those of thyrotoxicosis.

The thyroid gland often shows pathological changes in Addison's disease although such changes as are described show no uniformity. Crooke and Russell (1935) described evidence of increased thyroid activity—tubular, often branched tubular, and rounded acini, either empty or containing a little coagulum, with lymphocytic infiltration. Brenner (1928–29) reported fibrosis and lymphocytic infiltration of the thyroid, the parenchyma of which showed signs either of increased or of diminished activity—sometimes as much diminished as in myxœdema. He thought it probable that the changes in the thyroid were due to the same cause as the suprarenal lesion, and not secondary to loss of suprarenal function.

As would be expected from the pathological changes in the thyroid, the B.M.R. is often altered in Addison's disease. It is usually depressed—about −7 to −8 per cent. according to Greene (1931). The case here recorded showed a depression (−27 per cent.) as low as in a fully developed case of myxœdema, and the question arises whether the previous treatment of the thyroid with X rays had made it more susceptible to the degenerative changes which so often accompany Addison's disease.

Conversely, it may be asked whether the degeneration of the suprarenal glands was in any way associated with the previous Graves's disease or with its treatment with X rays. There is some experimental evidence that the adrenal cortex inhibits the activity of the thyroid. Thus Marine and Baumann (1921) found that incomplete destruction of the suprarenal cortex in rabbits with intact thyroids—but not in those with thyroids removed—cause a rise in body temperature, and suggested that suprarenal insufficiency might be the cause of thyrotoxicosis. Koelsche (1934) showed that the suprarenal cortical hormone inhibited the stimulating effect of thyroxine on protein metabolism. On the other hand, evidence is lacking that destructive lesions of the thyroid affect the suprarenal cortex; if they did, suprarenal insufficiency would have been more often observed in the large numbers of patients who have undergone thyroidectomy, or radium or X ray treatment of the thyroid.

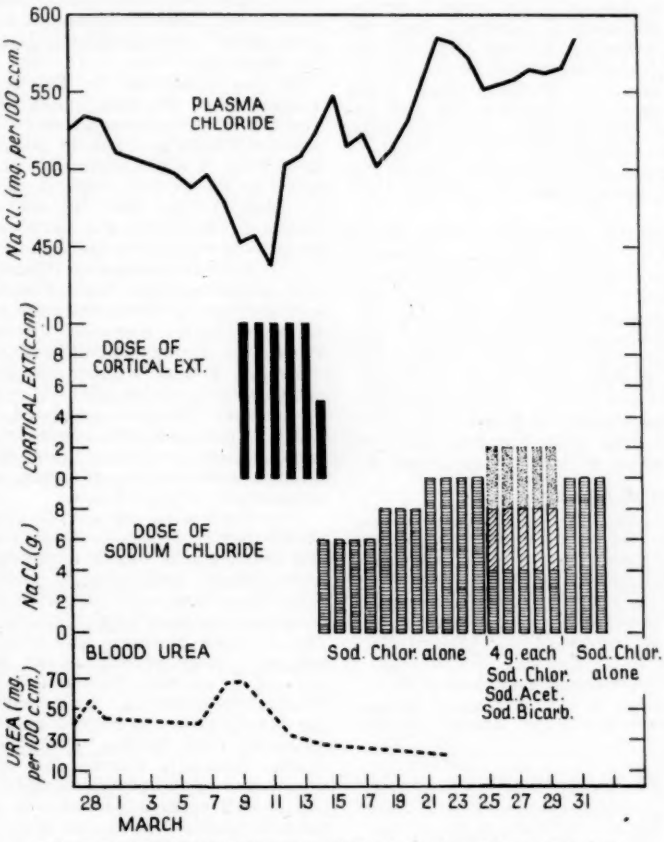

Chart showing chemical findings in relation to treatment (first admission).

Apart from the association of thyroid disease with Addison's disease, the clinical history of the patient during her first admission to hospital presented two other interesting features:—

(1) She had a strong distaste for salt or salty food, and it was very difficult to make her take salt until she realised that it made her feel better. This contrasts with the reports of other observers. Thus Snell (1934) and Hanssen (1936) both reported cases with a craving for salt.

(2) The crisis immediately followed a menstrual period. This relationship between menstruation and increased severity of symptoms in Addison's disease has been commented on by Weller (1936), one of whose patients had monthly attacks of vomiting at the time of expected, but absent, menstrual periods. The increase in suprarenal insufficiency is presumably due to the added stress of the menstrual period, which increases the need of the body for cortical hormone.

OBSERVATIONS ON CHLORIDE EXCRETION IN ADDISON'S DISEASE

In normal persons the excretion of chloride by the kidneys is so controlled by the requirements of the body that the concentration and the total amount of chloride in the plasma and tissues is maintained at a constant level. If the plasma concentration falls below normal, the excretion of chloride in the urine falls to a negligible amount. This is well shown in a series of experiments by Aitken (1929) in which the plasma-chloride concentrations of normal persons were reduced by placing them on a salt-free diet and

encouraging chloride loss by water-drinking and sweating. When the plasma-chloride concentration fell below 555 mg. of NaCl per 100 c.cm. the urinary excretion of chloride reached the approximately constant and negligible minimum of 5 mg. NaCl per hour.

It is only rarely that the kidney excretes chloride in anything but minimal amounts at levels of chloride in the plasma below 530 mg. per 100 c.cm. Such an alteration in what is usually called the "chloride threshold" occurs in Addison's disease, and occasionally in diabetes mellitus and chronic nephritis. In the latter diseases urinary chloride excretion at subnormal plasma chloride levels, when it occurs, is probably due to pathological changes in the renal parenchyma. In Addison's disease this chloride loss is due to lack of the hormone of the suprarenal cortex, one of the functions of this hormone being the control of sodium metabolism and the distribution of body water (Harrop and Weinstein 1933, Harrop 1936, Loeb, Atchley, Benedict, and Leland 1933). In the absence of the hormone, there is a drainage of sodium, accompanied by chlorine, from the body.

To demonstrate this loss of the power of the kidney to conserve chlorides in Addison's disease, observations were made on our patient during her first admission to hospital. On each occasion that a blood sample was taken for estimation of plasma chloride, she emptied her bladder fifteen minutes beforehand, and then passed urine just after the blood sample had been taken. The second specimen of urine was assumed to represent the urinary chloride excretion at the level of the plasma chloride found in the blood sample. As can be seen from the accompanying Table, urinary excretion of chloride continued for

CASE OF ADDISON'S DISEASE

	Plasma chlorides	Urinary chlorides
	(mg. NaCl per 100 c.cm.).	
Feb. 28th	534	390
„ 29th	531	360
Mar. 1st	511	290
„ 5th	496	700
„ 6th	488	880
Mar. 7th	496	470
„ 8th	479	310
„ 9th	452	270
„ 11th	438	200
„ 12th	502	210

TWO CASES OF INTESTINAL OBSTRUCTION

	Plasma chlorides	Urinary chlorides
	(mg. NaCl per 100 c.cm.).	
Pre-operative	467	Nil
After operation—		
12 hrs.	467	Nil
24 „	455	20
2 days	467	20
3 „	452	100
4 „	455	37
5 „	496	29
7 „	555	233
8 „	613	672
9 „	580	440
Pre-operative	470	67
After operation—		
12 hrs.	455	60
24 „	475	29
2 days	455	16
3 „	528	154
4 „	557	382

several days after the plasma-chloride concentration had fallen well below the usually accepted minimal normal level of about 530 mg. per 100 c.cm.

As a contrast to this case, similar observations were made on a series of cases with high intestinal obstruction, vomiting, and hypochloræmia. In both cases presented in the Table, the urinary chloride concentration during the period of hypochloræmia was very low, below 100 mg. per 100 c.cm. As soon as the plasma-chloride concentration rose to above 530–540 mg., chloride appeared in the urine in normal amounts, confirming the observations of Aitken (1929), mentioned previously.

While such a loss of chloride-conserving power is not specific for Addison's disease, being sometimes found also in nephritis and diabetes mellitus, it may be of some value in the differential diagnosis of Addison's disease, especially in cases without pigmentation. In the absence of evidence of diabetes or renal disease, the finding of a chloride concentration in the urine of over, say, 200 mg. per 100 c.cm., when the plasma chloride concentration is below the minimal normal level of about 530 mg. per 100 c.cm., would strongly suggest the presence of Addison's disease.

SPONTANEOUS HYPOGLYCÆMIA IN ADDISON'S DISEASE

The striking terminal phenomena after the patient's second admission to hospital were the coma and generalised muscular spasm, associated with severe hypoglycæmia.

Similar symptoms in the course of Addison's disease have previously been reported. Thus, in the first of the cases reported by Weller (1936) there was drowsiness and spastic contraction of the right arm, which Weller associated with the hypoglycæmia noted in the patient during a previous admission to hospital. In the sixth of the cases reported by Hanssen (1936) there was an episode almost identical with the symptoms shown by our patient.

The patient, a woman of 47, with Addison's disease of tuberculous origin, became confused and maniacal, and developed paralysis of the right arm and a bilateral extensor plantar response. Blood-sugar determinations made during the course of this episode showed values as low as 40 mg. per 100 c.cm., and the symptoms cleared up after the rectal administration of glucose. Hanssen suggested that the sudden death which sometimes occurs in Addison's disease, with no hæmoconcentration or other blood chemical findings characteristic of crisis, might be due to spontaneous hypoglycæmia.

Investigation of suprarenalectomised animals has shown that, in certain species at least, removal of the suprarenal glands causes a profound disturbance in carbohydrate metabolism. Britton and Silvette (1932) have demonstrated that in the guinea-pig and cat suprarenal insufficiency is accompanied by reduction in liver glycogen and blood-sugar, and that animals dying of suprarenal insufficiency show convulsive seizures similar to those observed in insulin hypoglycæmia. These authors consider that the convulsions are related to the hypoglycæmia, which, in their opinion, is the immediate cause of death. Similarly, Harrop and others (1935) have shown that in suprarenalectomised dogs, maintained either with cortical hormone or with salt, fasting produces weakness and coma, associated with extreme hypoglycæmia, but with no fall in plasma sodium or chlorides and no rise in blood non-protein nitrogen, and that glucose injection rapidly relieves the symptoms.

Recent work (Britton and Silvette 1934, Buell, Anderson, and Strauss 1936) has shown that animals suffering from suprarenal insufficiency have lost the ability to form liver glycogen from injected glucose or sodium lactate. The weight of evidence therefore suggests that the suprarenalectomised animal develops hypoglycæmia because it cannot form liver glycogen as a store to maintain its blood-sugar level. Since anorexia is common in Addison's disease, the failure to form liver glycogen from endogenous sources may well be the cause of the hypoglycæmia so often noted in this disease, and may explain the occurrence of coma in the absence of any changes in blood volume or plasma electrolytes.

In our patient, the plasma chlorides and blood-urea were both within normal limits at the time

of the terminal symptoms, and thus two of the characteristic blood chemical findings of an Addisonian crisis were lacking. On the other hand, there was extreme hypoglycæmia, and we hold that the coma and muscular spasm can be directly related to the hypoglycæmia. Although serum calcium and plasma alkaline reserve determinations were not carried out, the muscular spasm was obviously not of the nature of tetany, since it was unrelieved by calcium injection and the dramatic recovery of consciousness and the disappearance of the spasm after the administration of glucose and adrenaline made the diagnosis of hypoglycæmia certain.

It is less certain whether the fatal termination in spite of glucose treatment can be attributed to hypoglycæmia, but Rabinovitch and Barden (1932) have reported a case which seems to make this opinion at least tenable. Their patient, a youth of 17, suffered from spontaneous hypoglycæmia, due to replacement of the suprarenal medulla by lymphoid tissue. He developed coma and spastic contraction of the right arm, with a blood-sugar concentration of 25 mg. per 100 c.cm. Recovery of consciousness followed continuous intravenous glucose infusion, but the blood-sugar remained low despite this treatment, and he finally relapsed into coma and died. In this case the suprarenal cortex was comparatively undamaged, so that Addisonian crisis can be excluded as the cause of death.

Summary

A case of Addison's disease due to suprarenal atrophy and preceded by thyrotoxicosis is described. Death occurred in hypoglycæmia.

It is suggested that simultaneous determinations of the plasma chloride and urinary chloride concentrations are of value in the diagnosis of early cases of Addison's disease.

We are indebted to Prof. Stanley Davidson for permission to publish this case, and to Dr William Davidson for the post-mortem report.

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TORBAY HOSPITAL.—Eight acres of land on the western side of this hospital have been purchased. Accommodation is being provided for another 22 patients and a public appeal for the funds has brought in enough to liquidate the amount due to the contractors. About £6600 has been obtained from the contributory association. The out-patients' attendances reached 36,718, over 10,000 more than three years ago.

TREATMENT OF URINARY INFECTION

THE IMPORTANCE OF DIETARY CONTROL

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MANY of the methods of treating urinary infection have necessitated some control over the reaction of the urine. A satisfactory degree of alkalinity can usually be produced by the administration of sodium bicarbonate or potassium citrate provided adequate dosage is employed, but acidification has always been much more difficult to achieve. Control of the acidity of the urine became important with the introduction of the use of hexamine, but strict control has only been attempted since the adoption of the ketogenic diet and mandelic acid treatment.

When hexamine was first used, the somewhat obvious agent acid sodium phosphate was generally employed to acidify the urine, and this drug has had a wide vogue ever since. Some doubts however were cast on its efficacy as early as 1913 (Henderson and Palmer), and since the work of Haldane (1921) the administration of ammonium salts, such as the chloride, nitrate or, more recently, phosphate, has gained favour.

Diet, apart from drugs, also markedly influences the reaction of the urine, and can, if suitably arranged, nullify or reinforce the action of drugs.

KETOGENIC DIET

In 1931 Clark investigated the effects of giving patients a diet containing a large quantity of fat but the minimum of carbohydrate. This lack of carbohydrate causes incomplete combustion of the fat, with the result that certain acids, of which β-hydroxybutyric acid is the most important, appear in the urine. These acids fulfil two purposes, they make the urine acid and they act as bactericidal agents.

Very satisfactory results were obtained by this method but the diet is extremely unpleasant and many patients have difficulty in tolerating it. In order to eliminate the troublesome dietetic régime attempts were made to administer the β-hydroxybutyric acid by mouth, but it was found, as expected, that it is completely oxidised in the body and does not appear in the urine. Rosenheim (1935), however, discovered in mandelic acid an excellent substitute which can be given by mouth and yet escape oxidation and appear in the urine in sufficient quantity to be effective. With this drug the need for a low *p*H still exists, and it is probable that many failures of mandelic acid treatment are due to the inadequate acidification of the urine. Some investigators have thought that a modified ketogenic diet might serve to lower the *p*H of the urine sufficiently for the mandelic acid to be effective. Actually unless this type of diet is imposed with the utmost rigour and care it has no effect whatever on the reaction of the urine, even comparatively slight variations from the strict régime rendering it entirely valueless.

OTHER DIETARY MEASURES

There are, fortunately, other dietetic methods of changing the reaction of the urine which are easily tolerated.

For the past thirty years considerable knowledge of the mineral content of foods has been available but seems to have been given little practical application. Nearly all foods contain acid- or alkali-producing elements in varying proportions, so that after oxidation there remains an ash having a preponderance of acidity or alkalinity. Sherman and Gettler (1912) investigated the composition of many foods and, by estimating the sodium, potassium, calcium, magnesium, sulphur, phosphorus, and chlorine content, were able to calculate the excess of acidic or alkaline radicals present (see Table).

Table showing Acid-base Balance of Foods

Equivalent acid or alkali per 100 grammes edible foodstuff.

ALKALI-PRODUCING FOODS

Foodstuff.	Normal alkali (c.cm.).	Foodstuff.	Normal alkali (c.cm.).
Almonds	11·3	Horse-radish	5·5
Apples	3·4	Jelly	3·6
Apricots	7·2	Leeks	7·1
Asparagus	1·3	Lemons	4·8
Bananas	8·4	Lemon juice	4·6
Beans, dried	11·7	Lettuce	7·7
„ fresh string	5·6	Limes	11·5
Beets	11·1	Maple syrup	12·5
Blackberries	3·5	Milk, cow's, whole	1·8
Cabbage	4·3	„ „ skimmed	1·7
Cabbage greens	2·8	„ „ condensed	4·3
Cantaloupe	15·2	„ goat's	5·9
Carrots	10·9	„ human	0·8
Cauliflower	5·3	Molasses	31·6
Celery	8·7	Mushrooms	2·4
Cherries, red	5·6	Musk-melon	7·5
Chestnuts	12·6	Olives	48·0
Chocolate	7·9	Oranges	6·1
Cider	3·5	Orange juice	5·7
Citron	9·9	Parsnips	11·4
Cocoa	5·7	Peaches, fresh	5·8
Coconut, dried	2·3	Pears	3·1
„ fresh	2·2	Peas, dried	3·7
Cream	1·4	Pineapple	6·9
Cucumber	1·3	Potatoes	8·2
Currants, dried	16·6	Pumpkin	1·5
„ fresh	4·9	Radishes	4·7
Currant juice	5·3	Raisins	22·8
Dandelion	18·8	Rhubarb	9·2
Dates	12·6	Spinach	22·9
Endive	11·4	Strawberries	6·7
Figs, dried	28·4	Tomatoes	5·3
„ fresh	9·4	Turnips	7·5
Grape-fruit	4·1	Turnip tops	18·9
Grape juice	2·9	Watercress	11·3
Grapes	3·8	Water-melon	2·2
Hazel-nuts	5·4	Whey	2·4
Honey	9·5	Wine, average	2·1

Jams have approximately two-thirds the values of the corresponding fruits.

ACID-PRODUCING FOODS

Barley, pearl	5·1	Meat—	
Bread, white	6·5	Bacon	7·8
„ wholemeal	6·8	Beef	10·0
Cake, plain	4·3	Chicken	10·7
Cheese	7·6	Ham, boiled	10·0
Clams, round	4·1	„ medium fat	8·4
„ soft long	6·9	„ medium smoked	8·3
Cornflakes	5·4	„ smoked	9·6
Corn (maize), sweet	2·3	Liver	10·0
Crackers	9·6	Pork, lean	10·0
Doughnuts	7·3	Veal	10·8
Egg, white	6·3	Meat peptone	0·5
„ whole	12·7	Mustard	57·9
„ yolk	32·6	Oatmeal	16·3
Fish—		Oysters	10·5
Cod, salt	12·7	Peanuts	4·1
Haddock	8·5	Rice, brown	9·3
Halibut	9·3	„ puffed	9·0
Herring, smoked	10·0	„ white	9·0
Mackerel	9·3	Spaghetti	9·7
Salmon, fresh	11·0	Walnuts	7·8
„ tinned	10·7	Wheat, bran	10·5
Sardines	11·3	„ germ	19·3
Smelts	8·7	„ puffed	11·0
Flour, white	11·1	„ shredded	12·2
„ wholemeal	11·1	„ whole	13·5
Lentils, dried	8·2		
Macaroni	14·3		

Cranberries, plums, prunes.

NEUTRAL FOODS

Butter, cornflour, fresh peas, lard, onions, sugar, tapioca, vegetable oils.

The above Table is compiled from several sources but is calculated almost entirely from the sodium, potassium, magnesium, calcium, sulphur, phosphorus, and chlorine figures given recently by Sherman (1932).

Their results were expressed in terms of the number of cubic centimetres of normal acid or alkali available from 100 grammes of each food. The residue resulting from oxidation within the body is excreted by the kidneys and intestine, and thus tends to influence the reaction of the urine. With most foods the effect on the urine is exactly as the ash analyses would lead us to expect, but a few fruits—i.e., plums, prunes, and cranberries—act as acid-producers in the body in spite of yielding an alkaline ash. This apparent anomaly is explained by the fact that these fruits contain appreciable quantities of benzoic acid which escapes oxidation in the body and is excreted in the urine in conjugation with glycine as hippuric acid.

METHODS OF INVESTIGATION

A number of healthy men and women were placed on acidogenic and alkalogenic diets similar to those shown herewith.

ACIDOGENIC DIET

Breakfast.—Porridge or cereal with sugar and cream. Bacon and egg, bacon and kidney, or fish. Bread and butter.

Lunch.—Meat, chicken, or fish, or omelette (cheese or savoury). Stewed prunes and cream. Bread and butter. Cheese and biscuits.

Tea.—Minimum of tea with sugar and cream. Bread or toast with butter, or egg or sardine sandwiches.

Supper.—Meat or fish or cheese. Bread and butter. Walnuts. Minimum of coffee with cream and sugar.

ALKALOGENIC DIET

Breakfast.—Half grape-fruit or orange with sugar. Mushrooms and tomatoes on minimum of toast. Mixed fruit—dates, apples, or bananas. Tea with milk and sugar.

Midmorning.—Glass of milk with apple or banana.

Lunch.—Vegetable soup (celery, tomato, parsnips, turnips, onions, &c., but no meat stock, barley, or lentils). Green salad (tomato, cress, lettuce, cucumber, celery). Date and almond salad; baked apple, stewed fruit and junket, or raw fruit.

Tea.—Tea with milk and sugar. Green salad, raw vegetable salad or fruit salad. Minimum of bread and butter.

Supper.—Vegetables en casserole (onions, carrots, turnips, tomatoes, &c.). Potatoes. Stewed fruit and cornflour mould, raw fruit or almonds and raisins. Coffee with milk and sugar. Golden syrup may be taken with any meal.

The urine was collected at two-hourly intervals throughout the day and the *p*H of each specimen determined colorimetrically with as little delay as possible. The essential features of the acidogenic diet are the inclusion of meats, fish, bread, cereals, cheese, butter, and eggs, with plums, prunes, and cranberries as dessert. All of these foods have a comparatively low water content so that it was easy to arrange that subjects on this diet had a low urinary output. On the other hand the main articles of food in the alkalogenic diet—namely, potatoes, milk, fruit, and vegetables—all contain a large quantity of water and this makes it somewhat difficult to ensure a very low urinary output. Fortunately, as explained below, this is not of great consequence.

RESULTS

The results of an experiment on a healthy male are given herewith (Fig. 1) and similar results were obtained with several other individuals.

It will be seen that a normal person can render his urine relatively alkaline or markedly acid merely

by suitable selection of his food. It is clear that the attainment of an acid urine by the administration of drugs would be far more difficult in a person on a vegetarian diet than in one on a mixed diet. In order to test this point further the urine of individuals on an alkalogenic diet was collected and sufficient normal hydrochloric acid added to each sample to bring the *p*H to 5·3. On the average the total volume required to be added to the 24 hours' output of urine was about 75 c.cm. which is equivalent to the daily dose of ammonium chloride usually prescribed —namely, 4 grammes. It can thus be seen that, in a patient eating a vegetarian diet, this dose will only be effective in producing a highly acid urine under ideal conditions. As shown in Fig. 1, however, it is possible to maintain the reaction of the urine below 5·3 by diet alone. If drugs are used the diet will reinforce their effect.

Experiments were carried out to ascertain the effect of the ingestion of various amounts of water on the reaction of the urine. It was found that dilution of urine with distilled water in vitro has very little effect on the *p*H. Urine of *p*H 5, even when diluted tenfold, which is far outside usual physiological limits, generally changes to *p*H 5·2. Moreover, in the experiment shown in Fig. 1 the subject restricted his fluid intake during all days on the acidogenic diet with the exception of Nov. 3rd. On this day large quantities of fluid were taken but it will be seen that the effect on the reaction of the urine is not very great. Even this small decrease of acidity is of importance, however, and patients on an acidogenic diet should restrict their fluid intake as much as possible not only to achieve the maximum acidity but, more important, to keep the urinary concentration of mandelic acid, or other antiseptic which may be prescribed, as high as possible. When alkaline drugs are being administered the small

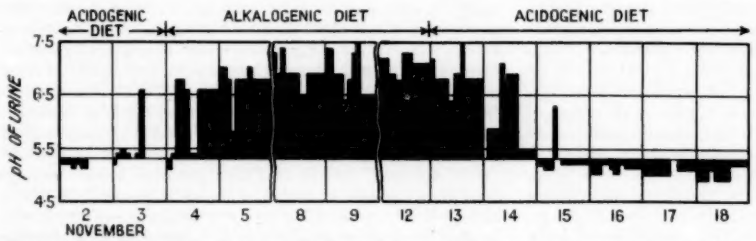

FIG. 1.—Effect of acidogenic and alkalogenic diets on the urine of a healthy male. Each day began at 8 A.M., just before breakfast. Several days are omitted from the complete experiment for reasons of space. A line is drawn at *p*H 5·3 and reactions above and below this line are shaded. On all days when an acidogenic diet was taken fluid was restricted except on Nov. 3rd when large quantities of fluids were taken. This has the effect of slightly raising the *p*H. It will be noticed that about 40 hours of an acidogenic diet were required on Nov. 13th and 14th to "wash out" the effect of the previous ten days' alkalogenic diet. After this the *p*H of the urine did not rise above 5·3 except for 2 hours on Nov. 15th, when it rose to 6·3.

effect of dilution on the reaction of the urine can be disregarded, as clinical experience seems to show that a marked diuresis is essential in the treatment of cases in which these drugs are used.

It will be noticed that there is very little evidence of acid or alkaline "tides" in the above results, but on some occasions unexplained variations of *p*H occurred at approximately similar times of the day. These variations were probably connected with the habits of the individual. There is no doubt that the usual acid or alkaline "tides" must be dependent, to a great extent, on the activity of the individual, the times at which meals are taken, and especially on the nature and quantity of the food ingested.

PRACTICAL APPLICATION

The above facts were demonstrated on several patients. Allowing them their own selection of diet and placing no restriction on "acid fruits" such as oranges and lemons it was found that the average *p*H of the urine was 5·5 or even 6 under the usual dosage of mandelic acid preparations. On correcting the diet the *p*H could be maintained below 5·3. These facts are illustrated by the following case.

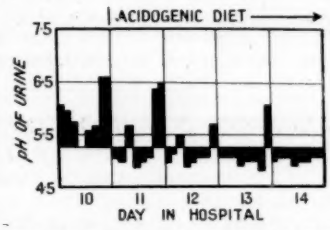

FIG. 2.—The effect of an acidogenic diet on the urine of a patient receiving mandelic acid. Before the diet the average *p*H was 5·8. Each day began at noon, just before lunch. Up to and including the tenth day in hospital the patient selected his own diet. On the following days an acidogenic diet was given.

An otherwise healthy male, aged 22 years, complained of severe pain in the right loin. During the next fortnight he suffered intermittently from this pain and had a widely swinging temperature. He then passed a small stone and noticed that his urine was cloudy. Alkalis were administered for the next month but without effect. He was referred to hospital and placed on the usual dosage of a well-known preparation of mandelic acid containing phosphates as an acidifying agent. During the next ten days it was noticed that the average reaction of the urine was about 5·8. On the tenth day of his stay in hospital the urine was collected at three-hourly intervals throughout the day and night. On the eleventh and subsequent days the patient was given an acidogenic diet. No other alteration was made in the treatment and the satisfactory change of the reaction of the urine is shown in Fig. 2.

The above results show that the reaction of the urine can be much influenced by the diet both in normal persons and in patients suffering from urinary tract infections. It would seem expedient, therefore, to adjust the diet in all cases where the maintenance of an acid or alkaline urine is of importance. In many cases this control of the diet need not be rigid, slight modifications which are hardly noticed by the patient often being sufficient. It has been found that a strict alkalogenic diet can be taken for long periods without inconvenience. A strict acidogenic diet, however, may sometimes result in slight gastric discomfort, but this, together with the slight dyspnœa which often occurs, may be a manifestation of the acidosis and therefore inevitable.

SUMMARY

(1) Urine can be rendered and maintained relatively alkaline or highly acid by administration of diets composed of alkali- or of acid-producing foods. (2) Modifications of diet for this purpose are often useful in the treatment of urinary tract infection.

(3) A table of acid- and alkali-producing foods is presented.

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JAUNDICE COMPLICATING PNEUMONIA

WITH SPECIAL REFERENCE TO JAUNDICE WITH CHOLÆMIA AND ITS TREATMENT

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JAUNDICE is not a common complication of pneumonia. Amongst 860 cases of lobar pneumonia and broncho-pneumonia in the last three years at the North Middlesex County Hospital only 2 were recorded in which severe jaundice was thought to be a direct complication of pneumonia. One is described in this paper and in the other the patient died shortly after admission. A slight icteric tinge is seen more often, and Elton (1931) has shown that latent jaundice as manifested by the van den Bergh reaction is almost constant in pneumonia.

Many workers have investigated the cause of jaundice complicating pneumonia. Preti (1932) concludes that in pneumonia bilirubin may be formed in the lung itself and by entering the circulation may give rise to clinical jaundice. Chierici's (1932) findings, too, suggest that during the stage of red hepatisation bilirubin is formed outside the liver in the pneumonic focus. Mangeri (1931) was able to increase the bilirubin content of the blood in animals by injections of blood into the air-passages. Bruni (1929) thinks that jaundice in pneumonia should be classified as secondary acquired hæmolytic jaundice. Pisani (1930) concludes from a study of 9 cases of visible jaundice in a series of 54 cases of pneumonia that jaundice can be caused by toxic damage to the liver parenchyma, by venous stasis in the liver and by increased hæmolysis and also by angiocholitis due to penetration of pneumococci to the bile-ducts. Cases of jaundice due to the last cause have been recorded by Lemierre and Abrami (1910) and by Ardin-Delteil (1909). Jaundice may also be due to causes unassociated with pneumonia and, indeed, a case has been recorded (Lambert and Secretan 1932) in which it followed pneumonia and was due to an aneurysm of the hepatic artery pressing on the common bile-duct. Harris (1927) using dye tests showed that high temperature itself did not influence liver function and concluded that liver insufficiency in pneumococcal pneumonia was due to an accompanying toxæmia which damaged the liver. There was no alteration in liver function in advanced phthisis indicating that structural changes in the lungs did not play a part in producing liver inefficiency.

Anyone who sees many cases of pneumonia knows that cases with jaundice fall into two clinical groups —first, those in which the jaundice is slight and of no particular importance, and secondly, those in which it may herald a fatal issue. In a recent paper Coope, Osborn, and Pygott (1936) concluded that while some patients with pneumonia could suffer some liver damage and yet survive, nevertheless an increase of bile in the blood stream did indicate a disturbance of liver function with a worse prognosis. Alexander (1927) says:—

"A slight degree of jaundice often exists and is of no particular importance. When jaundice is marked it has been stated by many observers that it indicates a bad prognosis. It is usually due to a duodenal catarrh leading to obstruction of the bile-duct, but it is possible that in some of the most severe cases the jaundice is dependent upon the hæmolytic action of the pneumococcus. Unfortunately very little treatment is available in the latter type of jaundice."

In the present paper I am concerned chiefly with jaundice of serious nature. Such cases are recognised clinically by the associated symptoms of cholæmia and not by any special laboratory test. The clinical picture of cholæmia is not very clearly defined in pneumonia since it is complicated by the symptoms of the causal condition.

In diseases primarily affecting the liver such as acute necrosis the first symptom of cholæmia or failure of liver function is usually intense malaise. The patient is irritable and later apathetic. His skin is dry and muddy. The pulse-rate rises and there may be slight pyrexia, then anorexia, vomiting, jaundice, and constipation appear. In the final stage the patient is incoherent and delirious and has a subnormal temperature. Convulsions may occur. Sometimes there is air-hunger from acidosis, and also diarrhœa and tympanites. Leucine and tyrosine crystals may be found in the urine after alkalinisation. Hæmatemesis may occur, and the general hæmorrhagic tendency associated with acute destruction of liver tissue has been called "pseudo-hæmophilia hepatica" (Whitby and Britton 1935).

PATHOLOGY

It is well known that the liver is susceptible to many toxins and that its cells are very prone to show necrosis. In acute infectious diseases such as pneumonia cloudy swelling is an early change. In severe infections including pneumonia actual necrosis of liver cells occurs. Hurst and Simpson (1934) described a boy suffering from a myopathy who died of broncho-pneumonia complicated by jaundice. The histological changes in the liver were cloudy swelling and slight fatty changes, and in addition parietal zonal necrosis showing swollen granular cells containing karyolytic and pyknotic nuclei. Autolytic changes occur rapidly in the liver after death but in some cases of uncomplicated pneumonia in which it was possible to examine the liver within a few hours of death and in which autolytic changes were minimal definite necrotic changes were found. When severe jaundice complicates pneumonia therefore we may assume that some hepatic necrosis is present.

TREATMENT

Although the outlook in cases of cholæmia is usually considered to be hopeless I think that there is reason for not adopting a fatalistic outlook. Under treatment recovery may occur and the essential points in such treatment are the administration of glucose, insulin, and calcium, plus measures to combat circulatory failure.

Glucose.—The administration of glucose in liver disease is a well-established form of treatment, since it is known that the liver parenchyma is protected, if incompletely, from the action of toxins when it contains a good store of glycogen. Davis and Whipple (1919) proved that the immediate nutritional state influenced the effect of potential liver poisons by

showing that the destructive action of chloroform on the liver was intensified by previously withholding food. Newman (1928) showed that a series of cases in which jaundice followed chloroform administration had all been prepared for operation by starving and purging.

In order to protect the liver glucose should be given in large doses. Satke (1933) recommends up to 100 c.cm. of a 10 to 20 per cent. solution of dextrose intravenously but even this amount would seem to be too small. Some idea of the amount required may be obtained from the experiments of Mann and Magath (1922). These workers showed that dogs after complete hepatectomy developed twitchings and other evidence of hypoglycæmia which could be relieved by the injection of glucose at the rate of 0·25 g. per kg. body-weight per hour. A patient with severe cholæmia is comparable to a dehepatised animal and if he weighed 70 kg. he would need, on the basis of 0·25 g. per kg. per hour, 620 grammes of glucose in 24 hours.

If the patient is able to swallow it is easy to administer large amounts of sugar by mouth in the form of fruit drinks and barley-sugar. It is difficult to give much glucose by the rectum since solutions which are hypertonic—i.e., stronger than 5 per cent. —are absorbed with difficulty and cause irritation. In very ill patients glucose must be given parenterally and this is best done by the intravenous injection of a 30 per cent. solution warmed to body temperature. If pure dextrose is dissolved in distilled water and autoclaved for twenty minutes it can be given quite safely by the intravenous route. It is true that such a solution has been used to cause thrombosis of varicose veins but there is no danger of thrombosis in the arm if some normal saline is injected before removing the needle. In the case described below no symptoms occurred which could be attributed to lowering of intracranial tension by the hypertonic glucose.

Dextrose given intravenously immediately raises the blood-sugar above the renal threshold and hence some dextrose is lost in the urine. MacLachlan, Kastlin, and Lynch (1932) found that patients with acute lobar pneumonia could be given 25 per cent. glucose in normal saline continuously by the intravenous method and that it was utilised at the rate of 50–60 g. per hour. If it was given slowly enough no glucose appeared in the urine. Incidentally the above workers concluded that glucose was of no value in the treatment of pneumonia and if this is true any good effects in cases of pneumonia with jaundice must be ascribed to its ability to combat the liver condition.

Wilder and Sansum (1917) found that if glucose was given intravenously at a rate more rapid than 0·35 g. per pound body-weight per hour some was excreted in the urine. This would allow a ten-stone man about 166 c.cm. of 30 per cent. glucose per hour. This slow rate of injection is not always practicable and I have found that in normal persons not more than 5 g. of a total amount of 50 g. in 50 per cent. watery solution given intravenously at a rapid rate are lost in this way. More is probably lost in patients with liver disease but not sufficient to vitiate this form of administration.

Insulin.—Experimental work concerning the effect of insulin on the carbohydrate metabolism of the liver is somewhat contradictory. It seems probable, however, that insulin favours the storage of glycogen in the liver when plenty of dextrose is available. It has been shown that glycogen will accumulate in the livers of depancreatised dogs but that the rate of glycogen formation is greatly accelerated if insulin is given and it is probable that the deposition of liver glycogen is in large part due to the action of insulin. Umber (1922) used insulin and glucose in 38 cases of subacute yellow atrophy with 4 deaths. In one case a biopsy of the liver was performed and showed swollen pale granular liver cells containing bile-pigment and fat globules in the Kupffer cells. Icterus was severe and death seemed imminent. Thirty units of insulin twice a day and a rich carbohydrate diet were followed by a cure.

Calcium.—Minot and Cutler (1929) were able to produce acute hepatic insufficiency in dogs by the administration of carbon tetrachloride and the toxic manifestations shown by the animals closely resembled those of cholæmia in human beings. They also showed that dogs could be protected against the effect of carbon tetrachloride by the administration of calcium and also that dogs with early symptoms could be cured by calcium therapy. They concluded that, while it was improbable that the pathological lesions caused by the continued action of hepatic poisons could be prevented by calcium, acute hepatic intoxication was unquestionably beneficially influenced by calcium. Cantarow (1933) says he has used calcium therapy in two patients with subacute yellow "atrophy" with "brilliant and dramatic results." He recommends 10 c.cm. of 10 per cent. calcium gluconate intravenously. The following are the details of a case of cholæmia complicating lobar pneumonia treated by glucose, insulin, and calcium. The rarity of the condition and consequent lack of opportunity for further trial prompts me to record the details of treatment of a single case.

CASE RECORD

A man aged 44, a taxi-driver by occupation, was admitted to hospital on Dec. 9th, 1933, having been ill for four days with chills and pains in the left chest. Temp., 100° F.; respirations, 32; pulse-rate, 120; blood pressure, 160/80. Pleural friction heard in the left axilla and ample evidence of consolidation at both bases. On the 10th 300 c.cm. of air was injected into the left pleural cavity with rapid relief of pain. On the 12th slight jaundice appeared. He was given 250 c.cm. of 30 per cent. glucose and 50 units insulin intravenously. On the 13th he was deeply jaundiced. The temperature had fallen to 98° F. by lysis. The pulse-rate was about 110 and regular. Blood pressure 110/60. The heart sounds were distant. There was no evidence of fluid in the pleural sacs. He was in a state of constant delirium. The van den Bergh reaction was prompt direct positive. Bile-pigment and salts were present in the urine and the fæces were coloured. Another intravenous injection of 250 c.cm. of 30 per cent. glucose and 50 units insulin was given.

On Dec. 14th he appeared moribund. He vomited a little and was comatose. The general appearance and odour were those usually associated with dying patients. The odour may have been the "fœtor hepaticus" described by the old clinicians. On this day he received two intravenous injections of 560 c.cm. of 30 per cent. glucose with 100 units insulin and 10 c.cm. of 10 per cent. calcium gluconate intravenously. He also had five intramuscular injections of 1·7 c.cm. Coramine. On the 15th he seemed a little better though jaundice was still marked and he was comatose for long periods. At 2.30 P.M. he received 250 c.cm. of 30 per cent. glucose and 50 units insulin intravenously and at 10.30 P.M. 540 c.cm. of 30 per cent. glucose and 50 units insulin and 10 c.cm. of 10 per cent. calcium gluconate intravenously.

On Dec. 16th he was much dehydrated and showed evidence of circulatory failure and was given 560 c.cm. of 5 per cent. glucose in saline from a Crookes' ampoule. At 8 P.M. 400 c.cm. of 30 per cent. glucose and 60 units insulin were given intravenously. He was extremely drowsy and seemed to be dying. Sugar was present in the urine. On the 17th he received a total of 600 c.cm.

of 30 per cent. glucose and 120 units insulin intravenously. On the 18th he seemed better and again received intravenous injection 600 c.cm. of 30 per cent. glucose and 200 units insulin. On the 19th he was able to take 500 c.cm. of 30 per cent. glucose diluted in lemonade by mouth during the day. On the 20th he refused 30 per cent. glucose by mouth but took about 500 c.cm. of a 10 per cent. solution of glucose in 0·5 per cent. sodium chloride iced and flavoured with lemon juice. He was also given 420 c.cm. of 30 per cent. glucose and 100 units insulin intravenously.

On Dec. 21st he was given 360 c.cm. of 30 per cent. glucose and 100 units insulin intravenously. By this time he was very much improved and no further intravenous injections were given. He was able to take small amounts of food by mouth. He was seriously dehydrated and took considerable quantities of the glucose saline drink. The jaundice gradually disappeared. He was discharged on Feb. 15th, 1934, after a stay of nine weeks.

On Jan. 9th, 1934, the lævulose-tolerance test was carried out. The fasting blood-sugar was 126 mg. per 100 c.cm. Fifty grammes of lævulose was given by mouth, and after one hour the blood-sugar was 144 mg. and after one hour it had fallen to the fasting level indicating a normally functioning liver.

The accompanying Table shows the amounts of glucose, insulin, and calcium used.

Table showing Treatment

Date in Dec.	Glucose intravenous, 30 %.	Insulin in units.	Calcium gluconate, 10 %.	Other treatment.
	c.cm.		c.cm.	
12th	250	50	—	—
13th	250	50	—	—
14th	560	100	10	—
	560	100	—	—
15th	250	50	—	—
	540	50	10	—
16th	400	60	—	560 c.cm. 5 % glucose in normal saline intravenously.
17th	300	60	—	—
	300	60	—	—
18th	300	100	—	—
	300	100	—	—
19th	—	—	—	500 c.cm. 30 % glucose by mouth.
20th	420	100	—	—
21st	360	100	—	500 c.cm. 10 % glucose by mouth.
Total	4790	980	20	—

A single example can never be used to prove the value of any form of treatment and every clinician has seen apparently hopeless cases recover. A nihilistic attitude in such cases is not justified and while it is impossible to be sure that death would have occurred without the treatment used or to refute the view that recovery would have occurred without any treatment, I suggest that the treatment used had a beneficial effect.

SUMMARY

The causation of jaundice complicating pneumonia is discussed. The theoretical reasons for treating jaundice and cholæmia with insulin, glucose, and calcium are stated, and a case is reported in which such treatment was successful.

I am indebted to Mr. Ivor Lewis, medical superintendent of the North Middlesex County Hospital, for permission to publish the notes of this case.

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PERNICIOUS ANÆMIA IN AN INFANT

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THE existence of pernicious anæmia in infancy is disputed by many authorities for it is difficult to find authentic cases and it does not fit in with the present concept of the ætiology of this disease. The question arises whether there is any place for liver therapy in the primary anæmias of early life. Bachman (1936) has recently reported a case of macrocytic hyperchromic anæmia in an infant and reviewed 16 similar cases described since 1909. The recent cases were quickly cured by liver and remained well without any further treatment. Laboratory investigations showed that the majority had a normal icterus index and low gastric acidity. There was a history of infection in most of the infants. He put forward the view that the cause was dietetic combined with a low gastric acidity due to infection. His own case, an infant nine months old with a previous otitis, had a blood count with a colour-index of 1·11, the hæmoglobin being 83 per cent. The icterus index was normal; the stomach secreted only a little acid in response to histamine. Liver treatment brought about a reticulocyte response of 8 per cent., and when a normal blood picture had been restored the free acid in the stomach rose to within normal limits.

Parsons and Hawksley (1933) gave the following criteria for the diagnosis of pernicious anæmia in childhood: "In addition to megalocytosis there should be a high indirect van den Bergh, marked poikilocytosis, almost always an absence of free hydrochloric acid in the gastric juice, and a reticulocytosis with liver extract." The case described below fulfils these criteria.

CASE REPORT

The patient, aged 13 months, was admitted to the medical unit at St. Mary's Hospital in October, 1936. He had been vomiting for three weeks, and he was underweight and backward in development. He was very ill and looked as though he was going to die. Weighing 6¼ lb. at birth he had been breast fed until 7 months old; from then till 13 months he was fed on diluted cow's milk with the addition of white bread, orange juice, and two teaspoonfuls of Virol a day. His first teeth erupted at 7 months and he sat up at the same period. He has

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one brother and two sisters all in good health. His mother thought that he was a dull baby compared with her others. His parents and grandparents are alive and well.

On examination the infant had an extreme waxen pallor. His heart was considerably dilated, a widespread systolic murmur being heard in the chest, maximal at the lower end of the sternum. The veins in the neck were engorged, the liver edge was palpable halfway between the costal margin and the umbilicus, and the spleen could be easily felt. The anterior fontanelle was widely patent and showed much pulsation.

Laboratory investigations.—The icterus index was 17·6 units. The Wassermann reaction of the blood was negative. There was no occult blood in the fæces. An examination of the stool for fats showed: total fats 35·6 per cent., soaps 28·4 per cent., fatty acids 3·5 per cent., neutral fats 3·7 per cent. There was no free acid in the gastric juice. A blood count showed:—

Red cells	2,550,000	Leucocytes	8500
Hæmoglobin	50 %	Polymorphonuclears	26 %
Colour-index	0·98	Lymphocytes	68 %
		Large mononuclears	1 %
		Eosinophils	5 %
		Basophils	0 %

The red cells showed marked anisocytosis and poikilocytosis; they were strongly eosinophilic with but slight polychromasia. One nucleated red cell was seen in the film. The polymorphonuclears had many lobes to their nuclei, and platelets were almost absent from the film. The reticulocyte percentage was 1·3.

These results suggested that the child was suffering from an anæmia due to lack of the hæmopoietic principle.

Treatment and progress.—In view of his extreme illness we did not experiment, and he was given liver extract rather than any preparation containing Castle's extrinsic factor. He was treated with intramuscular injections of Campolon (2 c.cm. every day). This resulted in a reticulocyte response of 19 per cent. and a clinical improvement. A blood film taken at the time showed considerable polychromasia and 3400 nucleated red cells per c.mm. Iron was added to his diet in the form of iron and ammonium citrate gr. 3 three times a day. The blood count rose within a month to 5,000,000 red cells and 90 per cent. hæmoglobin, the colour-index being 0·9. The

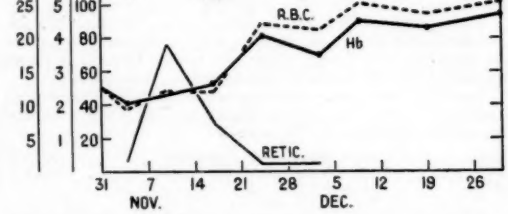

FIG. 1.—Chart showing reticulocyte response to campolon and progress of the patient in hospital. Retic. = reticulocytes. R.B.C. = red blood-cells. Hb. = hæmoglobin.

film showed numerous platelets, an increase of eosinophils, and slight anisocytosis and poikilocytosis of the red cells. The improvement was maintained, the child putting on over 3 lb. in three months. He was given a mixed diet, including marmite and orange juice. The course was however slightly marred by attacks of coryza. Fig. 1 represents the blood counts in chart form and shows his response to treatment. There was no free hydrochloric acid secreted in the gastric juice in response to an injection of histamine three months after the patient had been in hospital. The blood count at the time was normal and the patient was discharged.

DISCUSSION

A Price-Jones curve (Fig. 2) was drawn from a film taken before any treatment had been instituted. The megalocytosis and microcytosis, the values of σ and v resemble the pernicious anæmia curve seen in the adult. As a result of his age and gastric anacidity it is reasonable to suppose that the child's iron storage was deficient. The hyperchromic anæmia was probably superimposed upon a previous microcytic iron deficiency anæmia of infancy. The mean diameter of 7·4 μ in the Price-Jones curve may well have been a shift to the right of 1 μ from a previous

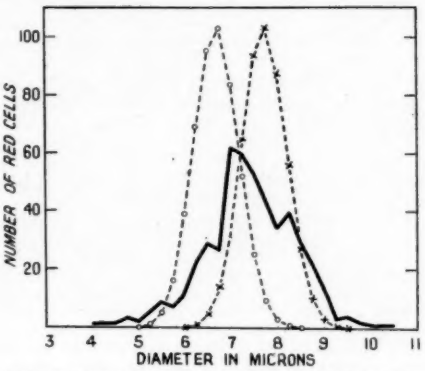

FIG. 2.—Price-Jones curve before treatment began.

6·4 μ. Castle and Minot (1936) state that "the typical macrocytic blood picture of pernicious anæmia may be modified by the presence of a complicating deficiency of iron to a normocytic or mildly hypochromic type." It will be interesting to see whether the patient remains well without liver therapy or whether he will need liver for the rest of his life.

The case appears to be one of pernicious anæmia in an infant modified hæmatologically by a probable initial iron deficiency by virtue of the patient's age and deficient gastric acidity. One of the most striking features of the case was the excellent reticulocyte response to liver treatment.

SUMMARY

A case of pernicious anæmia in an infant is described, which fulfils the criteria of Parsons and Hawksley for this diagnosis in that his anæmia was hyperchromic with a megalocytosis of 6·8 per cent., his icterus index was 17·6 units, his red cells showed considerable poikilocytosis, he secreted no free hydrochloric acid in response to histamine, and he had a reticulocyte response of 19 per cent. to campolon when his red cell count was 2,000,000 per c.mm. He was treated with liver and iron and discharged from hospital clinically well and with a normal blood picture.

We wish to thank Dr. W. E. Henley, assistant to the medical unit, who has carried out the chemical investigations.

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ROYAL HOSPITAL, WOLVERHAMPTON. — Expenses at this hospital during the last year have increased but contributions have kept pace with them. New extensions are proposed, consisting of a semi-basement and three storeys, planned so that in the future two or three more storeys can again be added if required. The semi-basement is to be made into a swimming-bath and a gymnasium for the nursing staff and resident officers and the first two floors will each accommodate thirty beds.

RELAPSING STAPHYLOCOCCAL SEPTICÆMIA

ASSOCIATED WITH CIRRHOSIS OF THE LIVER AND SPLENOMEGALY

BY F. A. PHILLIPPS, M.D. Camb.

ANÆSTHETIST TO THE EVELINA HOSPITAL FOR CHILDREN; LATE SENIOR CLINICAL ASSISTANT TO THE HOSPITAL FOR SICK CHILDREN

THE following case appears to me to be of considerable interest, and I therefore venture to report it. The patient, a well-developed man aged 29, serving in the Navy, had severe jaundice, which varied considerably during the period of observation.

HISTORY

When at Dartmouth in 1922, at the age of 15, he was told that he had a thrill in his pulmonary artery, and was not allowed cross-country runs, though he played all games, including rugger, squash, &c. 1927: had a febrile illness associated with hæmaturia; radiograms negative for stone. December, 1928: in Mediterranean, sent to Naval Hospital at Malta, diagnosed as rheumatic fever; hand, elbow, shoulder, and right arm only affected; profuse sweating. March, 1930: kick on right shin at rugger; abscess followed, which was drained and healed quickly. 1932: at this time he was first noticed to be yellow.

Apparently from 1930 to 1933 he was playing rugger, squash, tennis, &c., and was in good health. August, 1933: in sick quarters at Shotley, pain right shoulder; temperature 99° F.; treated with salicylates. September: transferred to R.N. Hospital, Chatham; very yellow in face, and right shoulder very painful; negative reaction to test for tuberculosis; right shoulder immobilised; pyrexia. Prolonged sick leave on account of stiff shoulder. August, 1934: febrile attack. January, 1935: again injured right shin, again with abscess formation. March: febrile. October: in hospital at Aden; febrile for a few days, yellow.

He was apparently afebrile from October, 1935, to March, 1936, having treatment for stiff right shoulder. March, 1936: right arm manipulated; he became much more jaundiced. April: he started gastric symptoms—"indigestion," pains after meals, jaundiced.

There was no history of alcoholism or venereal disease.

EXAMINATION

The liver, which was not enlarged, was easily palpable below the costal margin. The spleen was enlarged and hard, and descended to the level of the umbilicus. There was a rough systolic murmur maximal over the left intercostal space, with well-marked clubbing of the fingers. No Osler's nodes were observed. He had old arthritis of the right shoulder for which massage and mild movement had been given. The humerus could be moved some 30° before movement of the scapula was evident. No pain, heat, or swelling was present in the shoulder-joint, but all muscles were wasted and deltoid movement was very limited. The abdomen was somewhat distended, which was in part due to the splenic enlargement. Old scars were present on the right shin.

INVESTIGATIONS

Van den Bergh reaction.—June 29th: positive and direct 5·0 units. Icteric index 30.

Urine (Dr. W. J. Griffiths).—Urobilinogen not increased; bile, a trace; bile salts absent. Centrifuged deposit shows neither red cells, pus cells, nor casts.

Blood examination (June 29th, Dr. J. Bamforth):—

Red cells	3,840,000	Leucocytes	5900
Hæmoglobin	80%	Polymorphonuclears	60%
C.I.	1·04	Lymphocytes	33%
	(confirmed by repetition)	Hyalines	0·5%
		Eosinophils	2%
No malarial parasites.		No abnormal leucocytes.	

July 1st: platelets, 180,000 per cm.; reticulocytes, 2·4 per cent.

Serum found to be jaundiced. Sachs-Georgi reaction negative. Agglutination against *Brucella melitensis* and *abortus* was negative in all dilutions. Fragility of red cells, hæmolysis started at 0·4 per cent. (slightly more resistant than normal).

TREATMENT AND PROGRESS

At this period he was given Pernæmon Forte 5 c.cm. intramuscularly twice a week with ferri et ammon. cit. gr. 20 t.d.s., p.c. per os.

After his return home he continued to suffer from attacks of pyrexia at approximately fortnightly intervals, the temperature varying from 104° F. on occasion to 100°, the usual duration being for two or three days. The first of these attacks occurred in May, 1936, from which time they recurred throughout the course of the illness.

Blood examination.—On July 5th Dr. W. C. Carnegie Dickson made an examination of the blood during a pyrexial attack, the count of which did not differ materially from the previous one of Dr. Bamforth's, the colour-index being 1·3; polymorphs: 78·3 per cent. There was a moderate degree of anisocytosis with general increase in size to 9 or 10 μ: no appreciable poikilocytosis; no nucleated corpuscles or polychromasia. No malarial parasites, spirochætes, or kala-azar parasites were seen. Severe leucopenia; eosinophils absent; blood-platelets scanty. Brucella and abortus negative; fragility normal. Wassermann reaction negative. Gonorrhœa complement fixation, *slightly* more deviation than with normal.

Urine.—(non-catheter specimen): on ordinary agar, blood-agar, &c., a growth of *Staphylococcus aureus*; in fluid media a very occasional streptococcal chain.

Blood cultures.—Primary cultures and a series of sub-cultures at 16 and 26 hours showed no growth, but at 50 hours showed a pure growth of *S. aureus*. These cultures were made during a febrile attack, two cultures made on the 6th (pyrexia subsided) showed no growth at 56 hours.

Van den Bergh reaction.—Positive immediate direct; indirect also well marked (25 mg. per litre of serum).

Sedimentation test normal.

Consultation.—On July 17th the patient was seen by Sir Maurice Cassidy, Prof. J. W. McNee, and Dr. P. Manson-Bahr in consultation, when the question of tropical disease was fully discussed and eliminated. As a result of these deliberations cholecystography and a lævulose-tolerance test were carried out. At the same time a radiogram of the great trochanter of the left femur was taken, as persistent pain was complained of with slight swelling.

Radiography.—The cholecystography, by Dr. W. H. Coldwell and Dr. F. M. Allchin, was completely negative as dye did not enter, while the femur showed a small area of rarefaction with a sequestrum in its centre.

Lævulose test (Dr. Griffiths, July 27th): The blood-sugar curve after 30 g. of lævulose was, within the accepted limits of normality, as follows:—

Before test	0·117%	90 mins.	0·117%
30 mins.	0·135%	120 „	0·109%
60 „	0·139%		

A further blood count showed little difference from the previous ones, but the colour-index was 0·9.

During the months of August and September the patient continued to receive injections of pernæmon once a week. He showed some slight improvement as evidenced by diminution in size of the spleen, less jaundice, and a lowered height of pyrexia in the attacks.

On Oct. 17th, although he was not feeling well, he went out to dinner, and during the night developed a temperature of 103° F. with gastric symptoms which persisted, and on Oct. 21st he was transferred to St. Thomas's Hospital for further investigation.

A *blood count* (Dr. Bamforth) on this date showed: red cells, 25,400,000; hæmoglobin, 56 per cent.; colour-index, 1·09 per cent.; leucocytes, 5600. Reticulocytes very scarce—not more than 1 per cent. Fragility of red cells started just below 0·4 per cent. (more resistant than normal). No eosinophils in 200 leucocytes counted. A number of red cells showed polychromasia and a few cells showed basophil stippling, both constituted a small percentage of the cells.

Blood cultures taken on the same date gave numerous colonies of *S. aureus* in pure culture, while cultures of the sputum on Oct. 22nd gave an overwhelming growth of the same organism. On Oct. 24th and 26th he received intravenous injection of 40 c.cm. of staphylococcal antitoxin daily, after a preliminary testing with 0·1 c.cm. and on Oct. 25th 2 c.cm. of pernæmon forte. The rest of the treatment was symptomatic.

The patient's pyrexia persisted, the jaundice markedly increased, and he died on Oct. 27th in coma.

POST-MORTEM EXAMINATION (DR. J. O. OLIVER)

Disease.—Staphylococcal septicæmia, osteomyelitis, and cirrhosis of liver. Examined Oct. 27th, 1936. Age 30.

Weights of body and viscera.—Liver, 5 lb. 2 oz.; kidneys, left 17½ oz., right 17 oz.; heart, 17 oz.; spleen, 2 lb. 12 oz.

Report.—There was a quantity of slightly blood-stained fluid in the abdominal cavity. Straw-coloured fluid distended the pericardial sac. Large numbers of firm adhesions were present all around the gall-bladder and the main biliary duct.

The liver showed an extreme degree of multilobular cirrhosis with dilatation of all the larger bile channels of the liver. The gall-bladder itself was distended with concentrated bile. There did not appear to be any obstruction of the bile-ducts other than that which might be accounted for by the adhesions referred to above.

The heart was grossly dilated on the right side, and on the left side generally hypertrophied. A minute opening was present at the position of the foramen ovale, and this opening was valvular in type, suggesting a possible passage of blood from the left to the right side of the heart.

There was a small pyæmic abscess in the wall of the aorta about 1 in. above the aortic valve and this had ruptured into the aorta itself.

The left lung was semi-collapsed with some exudate at the base and a number of small pyæmic abscesses scattered throughout the lungs. The right lung was congested and œdematous.

The kidneys were extremely large and showed many small pyæmic abscesses running along the course of the blood-vessels.

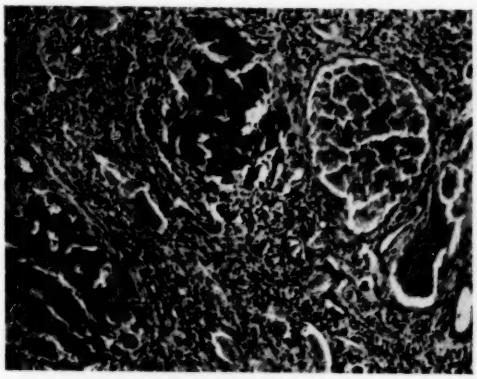
The spleen was large and showed some septic reaction in an organ which appeared to have been previously enlarged.

The left femur: a small superficial softened area was found in the bone in front of and below the great trochanter.

The brain showed congestion and œdema only. The sinuses showed no apparent infection in the ethmoid or frontal cells.

There was no macroscopic thrombosis of the splenic or portal veins.

A photomicrograph of a part of the liver is shown in the Figure, and Prof. McNee has kindly given me his opinion of the section: "This slide shows very typical advanced cirrhosis in a fairly active stage, with much round-celled infiltration."



Typical advanced cirrhosis in a fairly active stage.

COMMENT

Some points of particular interest in this case appear to be as follows: 1. The prolonged duration, probably a period of 8 years, with intermittent exacerbations of a staphylococcal infection. 2. The association of the above with multilobular cirrhosis of the liver, and considerable splenic enlargement. 3. The uniformly high colour-index. 4. The normal lævulose test in spite of the advanced cirrhosis. 5. The presence of a pyæmic abscess in the wall of the aorta.

My thanks are due to the many doctors who have carried out the numerous investigations for the use of their notes, and especially to Sir Maurice Cassidy for his kind criticisms and help with this report, to Prof. J. W. McNee for his opinion on the slide, and to Dr. J. O. Oliver for his account of the findings at autopsy.

CLINICAL AND LABORATORY NOTES

ACUTE SACRO-ILIAC STRAIN

A PERSONAL EXPERIENCE

BY R. Y. PATON, M.B. Camb., F.R.C.S. Eng.

SURGEON, ROYAL NATIONAL ORTHOPÆDIC HOSPITAL; CONSULTING ORTHOPÆDIC SURGEON, LONDON COUNTY COUNCIL

As I was digging in my garden the other morning and endeavouring to turn over a particularly resistant portion of clay soil, I experienced a sudden acute pain in the lower part of my back on the right side and on trying to straighten myself up was unable to do so.

It was with difficulty that I was able to walk a few yards to the house and with even more difficulty to ascend the few steps necessary. Walking was extremely painful and I could do so only with the right hip and right knee slightly flexed. On sitting down I found it very hard to get into a comfortable position and impossible to cross the right knee over the left without great pain. There was great tenderness over the upper portion of the right sacro-iliac joint and there was pain down the back of the right thigh and on the outer aspect of the right calf. Ten grains of aspirin made not the slightest impression on the pain. When the telephone rang it was with great difficulty that I levered myself out of a chair and walked the few feet to it.

After about an hour the pain was still as bad; so I thought I must attempt some form of self-manipulation, as I had relieved so many people in similar conditions by manipulation. I stood up as straight as I could with my legs abducted and my feet externally rotated. With my arms widely abducted I rotated my trunk towards the left and then suddenly, and as vigorously as I could, rotated my trunk round to the right as far as it could go. There was a sudden audible snap and the pain down the leg had completely gone. I was able to move perfectly freely again; I returned to the garden and completed my digging, and then I proceeded to pull a heavy roller all over the lawn without any discomfort or disability. The next day, apart from a slight ache in the right sacro-iliac region, there were no other symptoms whatsoever, all movements being perfectly free and painless.

Cases of acute sacro-iliac strain are common and their relief by manipulation is well known. The customary manipulation is to rotate the pelvis forwards with the shoulders fixed, at the same time using some down-pressure on the pelvis. This mani-

pulation can be done easily without an anæsthetic if the attack is of very recent onset, but later requires a general anæsthetic. The movements which I carried through in my own case were intended to reproduce this rotary movement as far as possible, and results show that they were successful.

I hope this small note will prove of use to any medical colleague who finds himself similarly smitten.

PULMONARY ŒDEMA FOLLOWING THE ADMINISTRATION OF ESERINE

BY W. E. COOKE, M.D. Liverp., F.R.C.P. Lond. and Edin., D.P.H.

DIRECTOR OF THE PATHOLOGICAL DEPARTMENT, WIGAN INFIRMARY

THE increasing frequency in the use of eserine in renal sympatheticotonus as well as the unusual fatality prompt this note.

A female, aged 19, was operated upon for subacute appendicitis in August, 1936. In January, 1937, she returned to Mr. J. B. Oldham with right renal colic. During the renal investigations it was noticed there was definite delay in the emptying of the right renal pelvis and the condition was diagnosed as renal sympatheticotonus. Immediate renal sympathectomy was considered unjustifiable, the patient sent home and her family doctor advised to inject 1/50 of a grain of eserine if attacks of colic recurred. She resumed her occupation, apparently well, until March 6th, 1937, when returning from work she had an attack of pain in the right flank. She walked into her doctor's waiting-room and lay on a couch. One-fiftieth of a grain of eserine was administered hypodermically. In a few seconds the patient was seized with intense respiratory distress, becoming increasingly urgent, and blood-stained frothy mucus poured from her mouth. She was given 1/100 of a grain of atropine but she died in about fifteen minutes after the eserine injection.

Autopsy.—The pupils were midway between contraction and dilatation. There was a band of adhesions anchoring the cæcum to the anterior abdominal wall. The pelves of both kidneys were injected and the bladder contained a little purulent urine. The larynx, trachea, and bronchi contained blood-stained frothy mucus. The lungs were voluminous and heavy, pitted on pressure, and on section poured out blood-stained serum. All the other organs were normal.

The above are the facts of the case, and comment seems unnecessary unless it is to point out the possible untoward effects of eserine and that, although atropine was administered, the course of the pulmonary œdema remained unchecked.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF UROLOGY

THIS section held its annual general meeting in London on April 22nd and 23rd under the presidency of Mr. BERNARD WARD (Liverpool).

Closed Prostatectomy

Mr. CLIFFORD MORSON opened a discussion on the Harris operation and its modifications. The most important modification that he himself had introduced was the substitution of a longitudinal for a transverse incision, and the elimination of the postero-lateral sutures in the reconstruction of the bladder base. He objected to such sutures because of their nearness to the ureteric orifices. For Harris's lateral sutures he substituted a figure-of-eight suture which he believed to be more effective in closing the cavity. Only if the urine was not sterile or if he was dissatisfied with the hæmostasis did he omit primary closure of the bladder. Mr. Morson then gave his reasons for preferring the Harris to all other techniques in prostatectomy. He did not wish to justify it simply because of the mortality-rate—for mortality-rates were deceptive unless at least 500 operations had been done—but because it eliminated many of the dangers and complications following prostatectomy, shortened the period of convalescence, and added to the patient's comfort. Both reactionary and secondary hæmorrhage were uncommon after it, and the stay in hospital was reduced by at least a fortnight. Moreover the Harris technique diminished what he termed the remote mortality of prostatectomy—i.e., deaths occurring some six months after the operation as a result of the strain to which patients had been subjected.

Mr. W. W. GALBRAITH (Glasgow) stated that in 27 out of 29 cases he had closed the bladder. In his opinion some of the opposition to the Harris technique was due to the fact that the principles laid down by Harris were not followed; especially was this true of preliminary treatment. But the fact that he, Mr. Galbraith, favoured the technique did not mean that he felt that it should be carried out in every case. Selection was necessary, and in this selection the state of the cardiovascular system was of very great importance.

Mr. TERENCE MILLIN said that the chief modification he had made in the original Harris technique was to substitute Lumbe's method of bringing down the posterior trigonal flap for that of Harris. As a precautionary measure he also placed two temporary "funk" silk sutures on the bladder and brought them out of the abdominal wound. If it became necessary to open the bladder because of hæmorrhage, the sutures made this easier.

Mr. C. A. WELLS (Liverpool) advocated the transverse incision employed by Harris, because he felt that it encouraged better healing. As a safety-valve he used a small suprapubic tube closed by a spigot. Through this the bladder could be washed out if need be.

Mr. A. H. JACOBS (Glasgow) was surprised that no speaker had mentioned that severe complications might follow the Harris technique. He himself had had two cases of serious pelvic cellulitis. In one of these the patient had died and post mortem an abscess was found posterior to and communicating with the prostatic cavity. This did not mean that he would not employ the Harris technique; but he felt it necessary to point out that its complications might be more serious than previous speakers had suggested.

Mr. MORTON WHITBY called attention to the importance of pre-operative treatment. He had devised a two-way catheter by means of which continuous irrigation might be carried out.

Mr. E. W. RICHES preferred a transverse to a longitudinal incision on the ground that his patients' comfort was thereby increased and convalescence shortened. Cases must be selected for the Harris operation, and he thought that when death occurred it was usually due to some systemic cause such as embolism or cardiac failure. As an anæsthetic he

liked a combination of a low spinal analgesia, followed by gas-and-oxygen with an abdominal field block.

Perurethral Operations

Mr. KENNETH WALKER read a paper on the treatment of prostatic obstruction by perurethral methods. He recalled that he had introduced a similar discussion as long ago as 1925. His mode of presentation would however be very different on this occasion. In 1925 it was necessary to plead for a method that was in its infancy—and in a none too healthy infancy. Now the child had grown so lusty and rampagious that in some parts of the world it was necessary to plead not for perurethral methods of treatment but for the parent operation of prostatectomy. He would therefore assume the attitude of a critic rather than of an apologist, dealing especially with the complications and disadvantages of perurethral resection. In his experience the main disadvantage was sepsis. Some of this sepsis was inevitable and due to the fact that the operator left behind coagulated tissue which formed an excellent nidus for organisms. Because of this there was a present tendency to turn again in the direction of Young's cold punch, using coagulation merely for sealing-off bleeding points. But some of the sepsis was due to the trauma of instrumentation. An electrotome was not an easy instrument to pass and in cases of involution of the genital tract, where the urethra was small, it was easy to damage the tissues. Another fruitful source of infection was probably opening up the space of Denonvilliers by perforating the trigonum. Mr. Walker concluded by discussing what cases were suitable for resection. Perurethral methods were particularly indicated in minor enlargement of the prostate and for patients in whom there were complications that made prostatectomy too dangerous.

Mr. R. H. O. B. ROBINSON described the technique employed at the Mayo Clinic. Two instruments were in use there, the Bumpus and the Thompson punch. Both instruments were difficult to handle because they were of the direct-vision type. They had the advantage, however, of causing less damage to tissues. He employed these methods at St. Thomas's and with satisfactory results.

Mr. F. MCG. LOUGHNANE called attention to the danger of resecting prostatic tissue on either side of 4 or 8 o'clock. Where he had disobeyed this rule he had had infection of the cave of Retzius.—Mr. H. P. WINSBURY-WHITE did not believe in massive resections but in removing only five or six fragments.—Mr. MILLIN preferred Young's punch for fibrous prostates because of the danger of pelvic cellulitis. In carcinoma and cases of post-prostatectomy obstruction the McCarthy resectotome gave excellent results.—Mr. JOHN EVERIDGE recalled a case where, in attempting to get the loop above a large lateral lobe in a bladder that could not be distended, the wall had been perforated. He said that in order to avoid hæmorrhage a cut could not be made too slowly.—Mr. RICHES pointed out the advantage of infiltrating the prostate, before resection, with 0·5 c.cm. of adrenaline in 10 c.cm. of Percaine solution. This materially reduced hæmorrhage. If clot-retention occurred after operation the glycerin of pepsin treatment gave excellent results.

Spinal Injuries and the Bladder

Sir JOHN THOMSON-WALKER on April 23rd read a paper on injuries to the spinal cord affecting the bladder. Before the late war, he said, it was taught that injuries to the lumbar swelling and cauda equina were followed by distension of the bladder and overflow. Experience during the war, however, showed that after such injuries periodic reflex micturition was soon established, the bladder learning to contract at intervals and to empty itself more or less satisfactorily. The chief problem during the war had been the avoidance and treatment of sepsis, 80 per cent. of spinal cases dying of "surgical kidney." He would therefore like to discuss how this appalling death-rate could be avoided. Four methods of treatment for the retention following spinal injuries were possible.

(1) Non-interference—i.e., allowing the distended bladder to empty itself by overflow.
(2) Emptying the bladder by abdominal pressure.
(3) The use of an in-dwelling catheter.
(4) An immediate prophylactic cystotomy.

The chief disadvantage of non-interference was that the rule that a distended bladder should be emptied by the passage of a catheter was so ingrained in the medical profession that during the transit of the wounded from the front to England, some doctor was bound to pass a catheter. Emptying of the bladder by pressure on the abdomen could only be carried out by someone skilled in this method of treatment. Spasm of the sphincters made it sometimes very difficult and rupture of the bladder had been reported. The chief complication that had arisen in the war from the use of an in-dwelling catheter was sloughing of the floor of the urethra at the penoscrotal junction. Personally he had advocated immediate prophylactic cystotomy as the best method of overcoming the peril of sepsis. While this did not prevent cystitis it removed the conditions favourable to the upward spread of sepsis—namely, infection associated with retention. What was required most in order to solve the problem was continuity not only of observation but also of treatment.

Sir ALFRED WEBB-JOHNSON thought that an authoritative statement that a catheter must never be passed in the presence of a spinal injury would save many lives. He suggested that the right combination of treatment might turn out to be non-interference at the front and early cystotomy at the base hospital or when the patient reached England.

Mr. KENNETH WATKINS (Manchester) confirmed the fact that cases of spinal injuries in civil life did not die of urinary sepsis. This was probably because, whereas most civil injuries were injuries to the cauda equina, most war injuries were at a higher level.

Mr. EVERIDGE described a case of spinal injury in the dorsolumbar region that had been successfully treated by early cystotomy.

Undescended Testis

Prof. GREY TURNER, in a paper on the treatment of the undescended testicle, said that up till 1927 he had made very little effort to save a misplaced testicle and had usually performed orchidectomy. Since then, however, he had adopted a more conservative attitude. He was sceptical about a testicle ever descending spontaneously after the third year of life. Some authorities considered that the best period of life at which to begin hormone treatment was at about nine; he himself was of the opinion that eleven or just before puberty was the time of election for operative treatment. This would allow of patients having a preliminary trial of gonadotropic hormone. In discussing operative technique, he laid emphasis on the importance of immobilisation of the cord as high up as possible. The chief obstacle

to a testicle being brought down was not shortness of the vessels but adhesions between the vas and the peritoneum.

Mr. W. McADAM ECCLES urged that the term "undescended testicle" should be abandoned in favour of "imperfectly migrated" testicle. Much had still to be learnt about this subject, and he felt that the greatest help would be obtained from the experience of medical officers to schools.

Mr. T. W. MIMPRISS gave the post-operative records of 80 cases treated by the Bevan technique at St. Thomas's Hospital. Only half of these operative results could be said to be satisfactory. Better results were noted with the transeptal technique and although there were as yet an insufficient number of cases available, it looked as if the Keetley-Thorek technique was going to give the best results of all. He was sceptical of the action of gonadotropic hormone.

Dr. RONALD SMITH (Rugby School) said that imperfectly descended testicle was extremely common amongst schoolboys. Contrary, however, to Prof. Grey Turner's belief, a very large number of these testicles descended spontaneously before puberty. He therefore recommended that all cases be left till puberty before an operation was undertaken.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

A MEETING of this society was held in Sheffield on April 2nd with Dr. J. W. BRIDE (Manchester), the president, in the chair.

Labour Obstructed by Fœtal Bladder

Dr. F. J. BURKE (Liverpool) gave an account of a case of dystocia due to over-distension of the fœtal bladder.

The patient, a multipara aged 29, went into labour at 9 P.M. on Jan. 27th, being about 35 weeks' pregnant. At midnight the head and hands of the fœtus were born but there was no further progress. When admitted to hospital she was having strong pains and was acutely distressed. The fundus reached to midway between the umbilicus and the ensiform cartilage, and no fœtal heart could be heard. A fœtal head and two hands were protruding through the vulva. The fœtal neck was long and the cervical spine was fractured—no doubt through vigorous traction by a practitioner who had been called in by the midwife. The thorax was found tightly plugged in the maternal pelvis, and an incision was made through the fœtal chest wall. A large quantity of fluid escaped and delivery was soon completed. The fœtus weighed 6 lb. and was considerably elongated, with the abdominal wall in large folds; there was also bilateral talipes equinovarus. Post mortem the bladder in its collapsed condition measured 6 in. by 4 in. and had hypertrophied walls. Both ureters were dilated and the kidneys enlarged. The urethra was patent, a small catheter passing without difficulty.

Dr. Burke said that several similar cases of distension of the fœtal bladder with patency of the urethra had been described, and he quoted those of Savage and Crawford and Jeffcoate. Neuromuscular dysfunction was the usual explanation of the failure of the fœtal bladder to empty itself. He also wondered what part was played by the fœtal kidneys in the production of liquor amnii. Gaylord Bates had pointed out the frequent association of oligohydramnios and fœtal renal anomalies. The biochemical studies of Makepiece Smith and Carroll strongly suggested that the liquor amnii was a transudate which, in early pregnancy, was in isometric equilibrium with maternal and fœtal blood, but in late pregnancy was hypotonic because of the addition of fœtal urine. On the other hand, there was evidence that the fœtal kidneys did not subscribe to the liquor amnii. Phloridzin injected into the mother could be readily detected in the fœtal tissues, but it was rare to find even a trace of sugar in the liquor amnii.

The PRESIDENT said that the condition seemed always to be associated with obstruction to the urethra, and that he supposed it was more common in the male fœtus.—Mr. J. E. STACEY referred to the elongation of the cervical vertebræ and the talipes equinovarus, and wondered whether the condition was associated with any spinal lesion.—Dr. BURKE, in reply, said he had no doubt that the elongation of the cervical vertebræ was produced by trauma.

Adenomyoma Causing Intestinal Obstruction

Mr. A. GOUGH (Leeds) described a case in which an adenomyoma was responsible for acute intestinal obstruction.

The patient, aged 42, had never been pregnant. She had had gradually increasing constipation for six months, culminating in complete obstruction. The day before Mr. Gough saw her, she had had absolute constipation as regards both fæces and flatus, and had vomited once. Her general condition was quite good, and there was a tense rounded swelling in the hypogastrium the size of a four months' pregnancy. On vaginal and rectal examination a hard fixed mass was felt behind the uterus and involving the upper part of the rectum. On opening the abdomen the rounded swelling was found to be a chocolate cyst of the left ovary. There was much indurated tissue involving the cervix and the upper part of the rectum. A diagnosis of adenomyoma was made, and later confirmed by histological examination. A colostomy was performed, after the bulk of the disease had been removed, including both ovaries and the uterus. A fortnight later, Mr. Gough was able to start making a way through the obstructed bowel, by passing gum elastic bougies up the rectum. These were followed later by rectal tubes passed from the colostomy downwards. In a fortnight the passage had been dilated to ¾ in. The colostomy was closed in stages by the use of an enterotome. Six days later the bowel was dissected from the abdominal wall and the wound closed. Some leakage occurred but within three weeks the fæcal fistula had closed.

Mr. GOUGH said that an acute obstruction due to an adenomyoma must be very rare indeed.—The PRESIDENT said it was quite clear that the adenomyoma was in the bowel wall, and not merely in the rectovaginal space.—Prof. LEYLAND ROBINSON (Liverpool) remarked that the case showed how important it was that a gynæcologist should have a knowledge of general surgery.

Dr. GLADYS KAY gave a demonstration of X ray films taken of pregnant women during the antenatal period. The PRESIDENT, Prof. A. M. CLAYE (Leeds), Mr. J. E. STACEY (Sheffield), and Mr. T. F. TODD (Manchester) took part in the discussion.

SALFORD ROYAL HOSPITAL.—Extensions and alterations to this hospital, though not quite finished, were opened on April 12th. The ceremony took place in the new Bernhard Baron orthopædic department, for which the trustees of the late Mr. Baron have given the sum of £3000. The erection of a new casualty department and the enlargement of the out-patients' accommodation have been made possible by a donation of £8000 from the Lancashire and Cheshire Miners' Welfare Fund. The hospital's deficiency on capital account now stands at £24,498.

REVIEWS AND NOTICES OF BOOKS

Diseases of the Nose, Throat, and Ear

A Handbook for Students and Practitioners. By I. SIMSON HALL, M.B., Ch.B., F.R.C.P.E., F.R.C.S.E., Surgeon to the Royal Infirmary, Edinburgh (Department for Diseases of Nose, Throat, and Ear). Edinburgh: E. and S. Livingstone. 1937. Pp. 422. 10*s.* 6*d.*

Mr. Simson Hall has tried to explain the essential features of disease of the throat, nose, and ear within the compass of a very small book intended for the student and the busy practitioner. It is due to the clearness of his thought and style that he has achieved a considerable measure of success, though the result would have been still better had he allowed himself a little more space. A very short account of the anatomy of the region is given before each section, and the usual methods of examination are described. But in many cases the picture presented of the commoner clinical types of a disease is not adequate to enable the practitioner to recognise it and make a diagnosis. This is especially notable in the section on diseases of the larynx, where the description of tuberculous laryngitis can give the reader no idea of its usual aspects. The flask-shaped arytenoids, "turban" epiglottis, and the early unilateral infiltration of the cord are not mentioned; no help is given in the paragraph on the diagnosis of this disease, and of the diagnosis of syphilitic laryngitis it is merely said that this is usually made by means of the Wassermann reaction. We must protest, too, against the statement that the routine method of combating dysphagia in tuberculous laryngitis is the free use of cocaine.

The best part of the book is that which deals with diseases of the ear, where the description of acute otitis and its complications is particularly lucid. When discussing the use of drugs, accurate doses and concentrations might usefully have been given. Boric and iodine powder is recommended for aural suppuration, but the proportions of the mixture are not stated in the text or in the appendix. Carbolic acid at a strength of 4 per cent. is advised in the acute stage of otitis media, but whether in aqueous solution, with a syringe or as drops, is not mentioned. In the short appendix on formulæ, ear drops of carbolic acid in glycerine are given at a strength of 5 grains to 2 ounces, or about one-half per cent., an unusually weak solution, and under Blegvad's drops the proportion of cocaine is not stated. We point out these errors of detail, because they are important in a book intended for use in a doctor's practice, and because we hope that they will be corrected in a subsequent edition. On the whole the teaching is clear and definite and the advice given is so sound that the work should have an established place among the smaller text-books on its subject.

Biological Laboratory Technique

By J. BRONTË GATENBY, B.A., B.Sc., D.Phil Oxon., M.A., Ph.D. Dubl., D.Sc. Lond., Professor of Zoology and Comparative Anatomy, Trinity College, Dublin University. London: J. and A. Churchill. 1937. Pp. 130. 7*s.* 6*d.*

OWING presumably to the variability of the materials used there is no such thing as a standard result obtained when making a microscopical preparation of a given tissue with a given procedure and reagents. The worker must get to know his materials by experience, and he obtains his results by a process which he can demonstrate but can rarely explain. If microscopy is, like cooking, an art, most books on microscopical technique have the same limitations of function as do books on cookery. Prof. Gatenby's work, however, should be valuable to teachers and to those who are beginning research mainly because he gives hints on just those minor but important points of detail which are generally omitted from text-books. An original and particularly useful chapter is the one dealing with methods of observing the structure and behaviour of the living cell, for the sight of a living cell is a lamentably rare experience for the average student of histology. The section which provides an introduction to the technique of microchemical testing will also be welcomed.

The title of the book is somewhat misleading since it deals solely with microscopy.

Recent Advances in Orthopædic Surgery

By B. H. BURNS, B.A., B.Ch., F.R.C.S., Orthopædic Surgeon to St. George's Hospital; and V. H. ELLIS, M.A., B.Ch., F.R.C.S., Orthopædic Surgeon to St. Mary's Hospital. London: J. and A. Churchill. 1937. Pp. 296. 15*s.*

THE authors of this excellent little book emphatically state that it is not intended to be a text-book but only a discussion of views held to-day on certain orthopædic subjects. Nevertheless, they survey a very wide field and contrive to compress into a small space an enormous amount of valuable information. They achieve this by a rigid economy in words without sacrificing clearness, by careful choice from a laborious study of the literature, and by the avoidance of unnecessary detail. They have interpreted "advances" in its widest sense—implying not only additions to knowledge but also the standardisation of ideas and methods previously in use. The acceptance, for instance, of Allison and Ghormley's classification of arthritis does not bring new knowledge, but does certainly introduce order out of chaos. Some knowledge on the part of the reader is assumed, but the appeal is not only to orthopædic surgeons.

Subjects of interest to general surgeons and to students such as chemistry of bone, bone tumours, acute and chronic osteomyelitis, tuberculous joints, and coxa vara, to mention only a few are included, and at the end of each chapter a carefully chosen bibliography of the more important works are appended. When an article, book, or discussion at a medical meeting has seemed to be particularly significant, it is summarised and made the subject of a complete chapter. It will be generally agreed that the article on that obscure subject "the painful shoulder" is particularly valuable. Few students will have the time or inclination to read Codman's admirable work, and the authors have rendered a service in summarising it so excellently.

The writing of a book on recent advances is an opportunity of reviving good ideas that run the risk of being forgotten, and it is surprising that no reference is made to Krida's work in connexion with the importance of correcting the anteversion of the neck of the femur in the treatment of congenital dislocation of the hips. The omission is the more surprising since in the X ray which is reproduced to show a result of a shelf operation, the head of the femur is anteverted by about 70 degrees. Apart

from this everything seems to have been included which can be interpreted as an advance during the last five years, and placed in its proper perspective. The book is small and easy to handle, and contains ample and well-chosen X rays and diagrams. It fills a long-felt gap, and should find its place on the bookshelves of surgeons interested in bone and joint disease. It is a book that will be easy to keep up to date, so that it should become a standard work for those studying for higher qualifications.

Fundamentals of Human Physiology

Fourth edition. By the late J. J. R. MACLEOD, M.B., D.Sc., F.R.S., late Regius Professor of Physiology in the University of Aberdeen; and R. J. SEYMOUR, M.S., M.D., Professor of Physiology, Ohio State University, Columbus, Ohio. London: Henry Kimpton. 1936. Pp. 424. 10*s*. 6*d*.

To revise even a small book which is twelve years old is a heavy task. Prof. Seymour has done it well; this work remains a reliable exposition of the fundamentals of human physiology, and as befits an introductory text-book, includes adequate information on anatomical and chemical points. It leaves no part of the subject untouched, having chapters not only on the special senses, but on subjects such as immunity, nutrition, and hygiene. Physiology is therefore presented in perspective, an important feature for the student who wishes to understand its scope and main principles without reading too widely. The editor states that the section on metabolism has been cut down by half and that on the endocrines expanded; but nutrition, digestion, and metabolism still cover a hundred pages, while the ductless glands are given only fifteen. The balance of the book thus needs attention in this direction if it is to represent modern physiology in miniature. It may be conceded, however, that the present arrangement accords sufficiently with the title, and in a work of this size sins of omissions must not be treated too seriously.

British Journal of Surgery

THE April issue contains the following papers:—

CARCINOMA OF THE MALE URETHRA, with report of a case. By Henry Mortensen (Melbourne). The rarity of the condition is noted and its association with persistent stricture requiring repeated dilatation. Suspicion should be roused when dilatation is unsatisfactory and there is a persistent discharge of blood from the urethra. Squamous metaplasia of the epithelium occurred in the case reported.

FAT EMBOLISM: report of a case, with review of the literature. By A. J. Watson (London). A fatal case is recounted. The origin of the fat emboli—either from the medullary fat or by aggregation of the fat emulsion of the plasma—is discussed. The symptoms may be pulmonary, with fat in the sputum, or systemic, with delirium, and fat in the urine.

PYELOGRAPHY IN RENAL HYDATIDS. By R. Campbell Begg (Wellington, N.Z.). The characteristic deformity of the pyelogram can decide the side, nature, and site of the lesion. In the absence of hydatids in the urine it differentiates hydatid disease of the liver, spleen, or perirenal region from that of the kidney.

MULTIPLE VILLOUS PAPILLOMATA OF THE GALL-BLADDER. By F. R. Brown and D. F. Cappell (Dundee and St. Andrews). Cholecystectomy was performed for acute cholecystitis, and multiple calculi were found.

A CASE OF RUPTURED ANEURYSM OF THE SPLENIC ARTERY WITH RECURRENCE. By Clifford G. Parsons (Birmingham). Rupture occurs first into the lesser sac, and only secondarily into the general peritoneal sac. Operation stands more chance of success in the first stage. In the case described ligature of the artery and splenectomy were followed by recovery. The recurrence was fatal, owing to technical difficulties of the operation.

ONE-STAGE LOBECTOMY FOR HYDATID DISEASE OF THE LUNG. By A. L. d'Abreu (Cardiff). The cyst was subpleural and probably on the point of rupture into the pleural cavity. There had been symptoms for 42 years. The patient, aged 60, made a splendid recovery with primary healing of the wound.

EFFECT OF BRACHIAL PLEXUS BLOCK ON PATIENTS SUFFERING FROM SECONDARY TRAUMATIC SHOCK. By H. J. B. Atkins (London). It was hoped to protect patients with severe injuries of the upper limb from the nervous impulses causing secondary shock. The result of the block was a large fall of blood pressure. This is attributed to the general action of the local anæsthetic, independent of the site of injection.

FIXATION OF THE HIP-JOINT BY MEANS OF AN EXTRA-ARTICULAR BONE-GRAFT: late results. By Hugh C. Trumble (Melbourne). A strong tibial graft is implanted between the ischial tuberosity and the upper end of the femoral shaft. The results in 8 cases of tuberculosis of the hip are encouraging. The tuberculous process has healed or is quiescent, and many of the patients have returned to their original occupations.

TREATMENT OF FRACTURED PATELLA BY EXCISION: a study of morphology and function. By R. Brooke (Chichester). The author thinks the patella has no useful function. Experiment on the cadaver shows that extension is more effective in its absence; and in 30 cases of fractured patellæ removal has been followed by rapid recovery of full function.

A NOTE ON THE EXTENSION APPARATUS OF THE KNEE-JOINT. By W. Hey Groves (Bristol). The insertion of the quadriceps tendon is shown to occur almost independently of the patella. The importance, in operations of repair, of preserving and suturing the lateral expansions of the quadriceps is noted.

SOME REFLECTIONS ON GASTROSTOMY. By E. S. J. King (Melbourne). Experience of 50 cases has led King to set down principles that should guide the surgeon in the choice of operation and in subsequent feeding. Attention is drawn to the advantages of solid food.

EXPERIMENTAL LESIONS OF THE RABBIT'S APPENDIX. By A. Q. Wells (London). Gangrenous appendicitis followed ligature of the appendicular vessels and the meso-appendix. Obstruction of the lumen of the appendix, associated with a lesion of the mucosa, caused appendicitis and death. Obstruction of the lumen alone caused mucocele. Ligature of the root of the appendix and of the vessels caused atrophy of the appendix, without inflammation.

INTESTINAL STRANGULATION: THE HISTAMINE CONTENT OF THE PERITONEAL EXUDATE FROM STRANGULATED INTESTINAL LOOPS. By Ian Aird and W. K. Henderson (Edinburgh). An 8-inch loop of lower ileum was isolated in a rubber bag. The histamine content was tested by the effect of extracts on blood pressure of atropinised cat, on rat uterus, and on virgin uterus and ileum of guinea-pigs. The total content amounted to as much as 4 mg. Although this amount is large, histamine is not to be regarded as the sole lethal factor in the exudate. Its bacterial origin is not wholly accepted.

EXPERIMENTAL OBSERVATIONS ON THE SPREAD OF CARCINOMA BY THE BLOOD STREAM, with special reference to the difference between the portal and systemic routes. By David H. Patey (London). A dilute emulsion in saline was used of the Brown-Pearce tumour of the scrotum of rabbits. Injection into the portal system of rabbits in 41 cases was followed by visceral tumours in 7. Similar injection into a systemic vein gave visceral tumours in 30 out of 44 cases.

BASIS OF TREATMENT OF VASOSPASTIC STATES OF THE EXTREMITIES: an experimental analysis in monkeys. By P. B. Ashcroft (London). The immediate and late effects of pre- and post-ganglionic division of the sympathetic nerve-supply to the limbs was studied by skin temperature records. Post-ganglionic division was found to produce a great increase in adrenaline sensitivity and an increased sensitivity to cold. It is suggested that this may account for "recurrences" after operations of sympathectomy on the upper limb, and that pre-ganglionic section is a better operation.

THE LANCET

LONDON: SATURDAY, MAY 1, 1937

INJURIES OF THE FACE

FEW of us reach maturity without having on some occasion suffered acute embarrassment from the consciousness of a facial lesion—be it only a scratch or mole or pimple. An assurance that others have not noticed it is offensive rather than comforting, for the oriental expression which identifies "face" with self-esteem implies but little exaggeration of the normal attitude. More serious and permanent lesions, whether congenital, such as cleft lip or nævi, or acquired, such as tissue loss or distortion after a wound or accident, can indeed inflict such mental trauma that the development of plastic surgery to its present high level is of far more than æsthetic value. BLAIR, BROWN, and BYARS,[1] in a recent study of injuries of the face, note that a conviction of deformity may even persist despite the most perfect repair, and that unless it is wisely handled may destroy the value to the patient of any operative measure. It is of the utmost importance, then, to avoid procedures immediately after any injury which will increase the final scarring. Often the plastic surgeon is more embarrassed by the scars of primary sutures or by the results of immediate débridement than he is by the direct effects of the injury. On the other hand, in fractures of the face delay may be even more dangerous from the cosmetic point of view, than immediate repair by one who is not an expert, since, according to these authors, once solidification occurs satisfactory reposition of bones of the face is nearly always impossible. In their article on prognosis in plastic surgery, GILLIES and MOWLEM[2] take a different view, holding that where there is no skin lesion demanding immediate treatment accurate reposition of the bony fragments may be facilitated by waiting for a week or so to allow swelling to subside. The position of the fragments can then be more readily ascertained by palpation and their replacement more exactly controlled. It must be remembered, however, that the procedure must depend on the degree of specialised experience of the surgeon and that the American authors are addressing the general rather than the expert plastic surgeon.

In treatment of injuries of the soft parts, the first rule is not to sacrifice tissue. A great deal of faith can be placed in the vitality of flaps of facial tissue. In certain types of injury to the soft parts primary suture is also important. Blair, Brown, and Byars cite four in particular: In the "trap-door" flap with a narrowly bevelled edge, delay in suturing the thin edge into position may lead to its crumpling up in the scar, with an obvious cushioning of the tissue beyond it. Careful reposition of torn pieces of ear, again, may be the only chance of preventing distortion. Narrow, double-surfaced flaps, as at the border of the lip, ear, or eyelid, if left hanging are apt to become so twisted as to be unusable in a subsequent repair. Finally it is recommended that all cuts and tears of the skin of the nose and its cartilage be immediately closed with sutures as this may be extremely difficult to do later on. In this connexion we may note that in a recent publication another American surgeon, J. EASTMAN SHEEHAN,[3] deals with the repair of cartilaginous defects of the nose in very great and useful detail, though his views on the utilisation of cartilage in preference to bone for the restoration of major losses of the bridge line do not correspond with modern British practice. In the nose immediate reduction of bony and cartilaginous displacements of the parts is advisable, for a late replacement may be a formidable procedure. There is a difference of opinion among experts as to the value of intranasal packing in retaining the reduced fragments. Blair, Brown, and Byars use a metal splint in cases which do not remain reduced without difficulty. They draw attention to the importance of nasal injury in small children. The possibility of distorted growth of the septal cartilage resulting in later life should be remembered, even after injuries that at the time seem trivial. Their practice is to explain the position to the parents and obtain consent to make forcible pressure on the bony ridge from within so as to straighten any bend in the septum.

The value of coöperation with the dental surgeon in all fractures of the jaws is well recognised in this country. Often the repair is primarily an orthodontic problem. The two methods now employed are interdental wiring and the dental splint. Almost any fracture with sufficient displacement to require splintage must be compound. Ordinary wire buried in the jaw will in most cases result in osteomyelitis and bone loss. Possibly the passage of wire through the alveolus of the fragment with fixation to an adjacent tooth is a safer method since the wire can be recovered in a week or two. The involvement of the tooth socket in a fracture of the jaw is a complication which needs attention. If necessary, drainage must be provided by an external incision under the border of the bone right up to the slit that enters the socket. The edentulous jaw presents its own problems, but they can often be met satisfactorily by use of the dental plate or plates. But if the case is seen early such heroic measures are seldom required. It is essential to remove any teeth which lie either in or very near to the fracture line since they will act as foreign bodies; the open sockets thus created usually supply sufficient drainage. The importance of avoiding through-suturing of the skin with thick sutures of silk or silkworm-gut should be impressed on all casualty officers. When horse-hair sutures removed in 48 hours or so are obviously insufficient

[1] Blair, V. P., Brown, J. B., and Byars, L. T. (1937) *Surg. Gynec. Obstet.* **64**, 358.
[2] Gillies, H., and Mowlem, R. (1936) *Lancet*, **2**, 1411.
[3] Plastic Surgery of the Nose. 2nd edition. By J. Eastman Sheehan. London: Humphrey Milford, Oxford University Press. 1936. Pp. 186. 38*s*.

to retain the tissues in accurate apposition, much can be done with subcuticular stitching which is nowhere more valuable than on the face. Subdermal interrupted sutures of very fine silk may be inserted in deep wounds if the ends of the suture are left protruding from the corner of the wound to allow of the knot being subsequently discarded. Adhesive plaster is often better than any suture, and injuries of the lips can sometimes be repaired from the mucous surface with adhesive plaster to hold the skin edges. It is sometimes unwise to bury catgut in the lip and the repair may be effected by fine silk or silkworm-gut for skin and fine catgut for muscle and mucous membrane.

HYPERTONIC SUCROSE

INTRAVENOUS injections of a hypertonic solution of dextrose—or sodium chloride—are commonly employed in the treatment of states of raised intracranial pressure. The fall in the intracranial pressure which results from such an injection has been measured in experiments upon animals and by direct manometric observations in humans; the reduction of pressure has been found to be more conspicuous when the pressure is considerably above normal. This form of treatment is not always successful in effecting clinical improvement, and it is well recognised that after a short interval of time a relapse is liable to occur which may leave the patient in a more serious state. There is experimental proof that such relapses are due to a reactionary rise of the intracranial pressure at times to a figure above its former value. This reactionary rise indeed constitutes a serious drawback to the method of treatment, although repeated injections may be given to obviate it. If sucrose is substituted for dextrose, hypertonic solutions are found to possess a similar osmotic property of reducing the intracranial pressure, but without the objectionable reaction. Following the intravenous injection of hypertonic dextrose, there occurs an increase in the quantity of hydrolysable carbohydrate in the cerebro-spinal fluid which is not observed if sucrose is employed. It is likely that the mechanism of the reactionary rise in the intracranial pressure depends on this alteration in the composition of the cerebro-spinal fluid and consequently of its osmotic pressure. HAHN, RAMSEY, and KOHLSTAEDT[1] have recently published a short review of this subject of "osmotic therapy," with special reference to the treatment of cases of brain injury. In a series of twenty-five such patients, they gave single or repeated doses of sucrose, usually 100 c.cm. of 50 per cent. solution. Their experience leads them to consider sucrose a valuable substitute for dextrose, causing an effective reduction in the intracranial pressure with freedom from untoward after-effects. They record in detail the notes of three cases treated in this manner. The injections noticeably improved the patients' colour, respiratory rhythm, and state of consciousness, and reduced the systolic and diastolic blood pressures. The authors consider that criteria such as these are as dependable as the unequivocal information obtained by spinal manometry. They note that in the unconscious patient, the too frequent injection of hypertonic solutions may lead to dangerous dehydration, owing to the resulting diuresis. We would add that intravenous therapy should not be resorted to indiscriminately in cases of injury to the brain; some of these cases have an abnormally low intracranial pressure, a state which might be aggravated by this form of treatment.

[1] Hahn, E. Vernon, Ramsey, Frank B., and Kohlstaedt, Kenneth G. (1937) *J. Amer. med. Ass.* **108**, 773.

THE SHORTAGE OF VETERINARY SURGEONS

IN the April issue of the *Veterinary Journal* a special educational number, there are points of great interest not only to boys seeking a career and their parents or advisers, but to all practitioners of medicine, from their position as guardians of the public health. Here the two branches of medicine, the human and the veterinary, play individual and combined parts, and any shortage in the total number of the veterinary body may reflect seriously upon the joint efforts. For the diseases of animals which are communicable to man are far spread in their evil influences. In this country anthrax, glanders, and rabies are now fortunately rare if terrifying spectres. Their eradication is mainly due to the control exercised by the veterinary department of the Ministry of Agriculture and Fisheries over their respective sources of origin, bovine, equine, and canine. It is to be hoped that we shall never again in this country have to fear these terrible menaces to man; but this security depends upon the continuance of the present keen veterinary inspection at each port where animals are allowed to land, as well as on quarantine laws and those governing the importation of animal products. Efforts directed towards prevention of the spread to humans of brucella infections and of foot and mouth disease must also be recalled. In the inspection of meat for human food the man who must by virtue of his training know most about the matter is the veterinary surgeon. He is the one best qualified to detect disease in the food animal before slaughter and to guarantee the soundness of the flesh when dressed for human consumption. And in the present fight against tuberculosis, which is an uppermost theme in every mind, the medical man works with the veterinarian; and only through such collaboration can measures of prevention be considered or a successful conclusion to endeavour be anticipated.

The editor of the *Veterinary Journal* draws attention to the shortage of veterinary surgeons throughout the country and the difficulties which exist in obtaining the help of qualified assistants. This is to be attributed largely to the openings existing in the Colonies, and the recently formed Veterinary State Service, whose most urgent duty—the eradication of the tuberculous cow—absorbs many workers. It is necessary to bear constantly in mind the fact that every year between 2500 and 3000 deaths of children under 5 years of age are traceable to the drinking of tubercle-infected milk.

If reliance is placed upon many published statements there are some million tuberculous cows in Great Britain and Ireland, while in many districts the dairy herds are infected to the extent of from 30 to even 60 per cent. As recently as last Tuesday Lord DAWSON reminded the House of Lords, in connexion with the present need for pasteurisation of milk, that the decline in mortality from bovine tuberculosis had not kept pace with that from the human form of infection. If an intensified effort to eradicate the tuberculous cow is a great task before the veterinarian we are reminded how varied and important are the other directions in which his services are required in the promotion and protection of public health. The shortage of qualified veterinary surgeons is therefore a matter of real concern. The young man entering the veterinary profession to-day will find that he has joined a service which is increasingly needed and valued; the whole world counts on his help. But the more this is so the more evident is it that the educational course must become increasingly comprehensive, and the tests to be satisfied grow harder. An extension of the curriculum has already been made, and university courses are running concurrently with those connected with the practising diploma, but the danger of discouraging candidates by insisting on too prolonged and arduous a course of study must be borne in mind. Students entering the veterinary profession now will command better material rewards than has been possible in the past, as there are almost limitless possibilities of promoting the welfare of the human as well as the animal kingdom.

ANNOTATIONS

RADIOTHERAPEUTIC HOSPITAL DEPARTMENTS

THE assumption which pervades the official memorandum on provision of radiotherapeutic departments in general hospitals just issued [1] is that any discussion in general terms as to the place of surgery, X ray and radium therapy in the treatment of cancer is obsolete. In about 40 per cent. of the cases of malignant disease admitted annually to hospitals the tumours are in the so-called "accessible" organs, the term "accessible" being used to define those which are most amenable to treatment by radiation, or a combination of it with surgery—viz., uterus, mouth, skin, and breast. Radiation methods are also being tried with varying degrees of frequency and success for a proportion (here estimated as about 10 per cent.) of the patients with cancer in other regions. Since much can be done in the way of palliation by radiation methods, no sharp distinction can be drawn between cases treated with or without hope of permanent benefit. The need for facilities for treatment by both forms of radiation methods—radium and X rays—as well as for operative surgery in a general hospital which claims to give an adequate cancer service is now recognised, and the problem is narrowed to the calculation of the size of hospital which may be expected to yield enough cancer patients to make reasonably full use of radiation facilities. Lieut.-Colonel Smallman, who has compiled this memorandum for the Ministry of Health, estimates this at a hospital of the order of 300 beds of which some 30 to 40 might be expected to be required by cancer patients of the "treatable" types. The necessary provision of radium for a hospital of this size is put at about 1·0 gramme of radium and, for deep X ray therapy, two or three tubes working at a voltage of 200–250 kilo-volts; and two model layouts for a department of this order are detailed with plans. Provision of larger masses of radium for distance therapy by so-called bombs is omitted from consideration, as being in a stage of development which makes it suited only to the larger centres. But attention is given to the choice, training, and organisation of a unit which will provide the necessary team-work in the absence of a director—still very difficult to find—who is expert at all three branches of treatment, and is able also to supervise the follow-up department and the collecting of records in suitable form. Apart from the internal organisation of centres which will make an efficient cancer service available throughout the country, arrangements must be made for cases of cancer admitted to the smaller hospitals to be transferred to those with radiation facilities without undue delay when such transference seems desirable. The difficulties to be surmounted before this sort of scheme can be got into working order are fully recognised by Colonel Smallman, and a study of his discussion of the issues involved will convince those who have the responsibility for hospital services that there is no excuse for delay in organising a network of fully equipped centres to serve those districts which still need them. In a preparatory note Sir Arthur MacNalty acknowledges the courtesy of a number of physicians and surgeons who have made useful suggestions after considering the memorandum, which he believes to represent a consensus of authoritative medical opinion on the subject of radiotherapeutic hospital departments.

[1] Cancer: Memorandum on Provision of Radio-therapeutic Departments in General Hospitals. By A. B. Smallman, C.B.E., D.S.O., M.D. *Rep. publ. Hlth med. Subj., Lond.* No. 79. London: H.M. Stationery Office. 1937. Pp. 32. 7*d*.

THE ROYAL SURGICAL AID SOCIETY

THE Royal Surgical Aid Society in the course of 75 years' activity has provided well over a million patients with urgently needed surgical appliances. It has since the opening of the century received Royal patronage and the occasion of the Coronation is being taken to make a departure which should lead to an extension of its valuable services. The plan of work is that the patient obtains a certificate from a surgeon of fitness for aid and then collects from subscribers to the Society the number of letters of recommendation specified as necessary. An annual subscription of half a guinea, or a life subscription of five guineas, entitles the subscriber to two recommendations per annum, the number of recommendations increasing in proportion to the amount of subscription or donation. That is the existing method, but, in order to mark the event of the Coronation, the committee of the Society propose to issue double the usual number of recommendations in respect of all special "Coronation donations" during the month of May. The increase in the number of those whom the Society can help which should result will mean a boon to many sufferers, for the applications for aid are always far in excess of what can be dealt with. Study of the annual report for 1936 reveals something of the extent and importance of the Society's work. During that year 27,156 patients

obtained help through the Society, and the appliances supplied totalled 35,263. Requests received from the distressed areas were so numerous that a special fund was created to deal with them, and a successful appeal was launched enabling special grants to be made to all authorised distressed area cases.

A valuable aspect of the work of the Royal Surgical Aid Society is that, while relieving much distress, it enables the benefactories who would otherwise be chronically handicapped to lead normal and useful lives. The annals of the Society are full of such promising histories, and every day applications are received where similar fortunate issues might be anticipated. In the L.C.C. housing estates preference is being given to tenants having delicate families, who thus form fields where surgical equipment is sadly needed. The Surgical Aid Society hopes in the Coronation year to receive support enabling it to help every suitable case from these areas.

THE BLOOD GROUPS IN AFFILIATION CASES

THE discovery of four, and later of twelve blood groups provided means of differentiating to some degree between the blood of different persons. Ever since it was discovered that the group characters are inherited according to unvarying rules, jurists have considered using this knowledge in the determination of affiliation suits. In most civilised countries the law requires the father of an illegitimate child by a single woman to contribute to its maintenance. Accusations of paternity are difficult to prove and the law of this country is satisfied with credible evidence by the mother corroborated in some material particular, provided that the evidence of the man does not refute it. A method of reaching greater certainty is therefore desirable.

The Medico-Legal Society discussed on April 22nd, under the chairmanship of its president, Mr. Ainsworth Mitchell, the practical and legal possibilities of using blood groups in evidence. Dr. G. Roche Lynch explained the nature of the twelve groups formed by combinations of the agglutinogens A, B, M, and N. He explained that almost all the original weaknesses of the laboratory methods have been recognised and abolished and that in experienced hands the tests are as nearly infallible as any scientific tests can be. Dr. David Harley expounded the rules by which the blood characters are inherited, and maintained that they are so completely authenticated as to be absolutely trustworthy. They state, shortly, that a child cannot inherit a blood character not possessed by either parent, and, moreover, that an O child cannot have an AB parent and vice versa. Mr. D. H. Kitchin pointed out some of the difficulties in the way of the legal exponents of the tests. Their cost, he said, puts them beyond the means of the poor men who are usually the defendants in affiliation proceedings. He had little doubt about the need for them, and strongly opposed the view, which is held even in some legal quarters, that the law only requires reasonable proof that intercourse has taken place at the proper time, and not proof of biological paternity. It is common knowledge that women of easy virtue who find themselves pregnant not infrequently choose the man who is most likely to be able to afford the maintenance of their child. At present, as Mr. Kitchin pointed out, a bench of magistrates has no power to order the woman to undergo the test, nor even to refuse her application because she will not. If all three bloods are typed and the results acquit a man, he still has to pay a considerable fee to the pathologist to come and give evidence. It is not possible yet to say what the attitude of magistrates is likely to be towards blood-group evidence, for it has only been brought before them once or twice and then has never pointed to an acquittal. There is no doubt, as Mr. Kitchin said, that the first case in this country in which non-paternity is definitely established will be very interesting and important. If the bench were to refuse to acquit the man an appeal would lie to quarter sessions and thence to the Divisional Court, and an opportunity would be given for a full argument of the validity of the tests in a court. Their establishment in one or two conclusive cases would pave the way for the legislation which would be necessary before they could attain their rightful place in the administration of the Bastardy Acts. It would be necessary to place some compulsion on the mother; as Judge Earengey, K.C., put it, the bench should have power, if the mother refused her coöperation, to grant an indefinite stay of the proceedings. It would also be necessary to provide that, unless one of the parties particularly desired the oral evidence of the pathologist, his certificate should be conclusive proof of the result of the test. Further, it would be necessary, to get the full value from the tests, to give the magistrates power to have them done at the public expense.

The most important feature of the discussion was the strong support of the movement by Sir Travers Humphreys, whose position and reputation as a judge of the King's Bench Division give his opinion authority. He said that the whole legal profession would welcome the blood-group tests if they were shown to further the cause of justice. He saw no real difficulty in saying in an Act of Parliament that a woman shall, if the court so direct, submit to a simple, painless operation. He also considered that the bench should have power to appoint an expert to do the test, just as a High Court judge is now allowed, under the New Procedure, to appoint an expert to report on any matter of scientific difficulty. Both he and Sir Ernest Graham-Little considered that the future of the blood-group tests in law depended very largely on the agreement of the medical profession that they are trustworthy.

THE PROMOTION OF LACTATION

THE influence of various hormones upon lactation is being studied closely at the present time from several aspects, of which that represented by agriculture is of great economic and commercial importance. S. J. Folley at the National Institute for Research in Dairying, Reading, has shown in conjunction with F. G. Young[1] that prolactin, one of the many hormones derived from the anterior lobe of the pituitary, can greatly increase the production of milk. Two dairy shorthorned cows in declining lactation were used for the experiment. One received 15 daily subcutaneous injections of 1 gramme of prolactin in 50 c.cm. of water; the other was given similar injections of distilled water. The cow receiving prolactin developed an increase in milk yield, rising to a maximum of 30 per cent. above the original daily yield. The percentage of fat in the milk remained unchanged while the injections were being given, while the percentage of non-fatty solids in the milk was considerably increased during this period and for some time afterwards. Folley has also studied the effect of œstrogenic hormones on lactation.[2] Four Guernsey cows were given injections of œstrone, partly in solution and partly suspended

[1] *Chem. Ind. Rev.* 1937, **56**, 96.
[2] *Biochem. J.* 1936, **30**, 2262.

in warmed castor oil, supplemented by a small amount of a solution of "dihydro-follicular-hormone benzoate" in sesame oil (the Progynon B Oleosum forte prepared by Messrs. Schering). The injections were intramuscular and preceded by a control period of at least 14 days, and the following calculations were made for successive three-day periods: mean daily milk yield, mean daily production of milk fat, mean daily production of milk non-fatty solids, mean percentage of fat in milk, and mean percentage of non-fatty solids in milk. The results showed that œstrogenic hormone injections were always followed by a considerable diminution in milk yield. The inhibition was temporary and was obviously correlated with a transient but considerable increase in the level of œstrogenic hormone in the blood. An attempt was made, by giving to one cow simultaneous injections of the œstrogenic hormone and prolactin, to determine whether the inhibition is exerted primarily on the anterior pituitary or whether it is a direct effect on the mammary gland; unfortunately the results were inconclusive. The effects of the œstrogenic hormone on the composition of the milk were remarkable, suggesting that the treatment had conferred upon the mammary gland the power to synthesise milk constituents at a higher rate than before treatment. An increase in concentration of solids in the milk secreted lasted for two or three months. These investigations have an obvious interest for those concerned with promoting the breast-feeding of infants, though the direct application of the results of such studies to the human subject would not be easy especially in view of the superstitions which have accumulated round the subject of breast-feeding. P. J. Greenway,[3] who is the systematic botanist at the East African Agricultural Research Station in Tanganyika Territory, has recently recorded some interesting observations on the artificial induction of lactation in women by administration of various concoctions both by mouth and by local injection. He records over a dozen plants which have a reputation in the territory as galactagogues, and there seems little doubt that some activity in the breast even of women who would not otherwise be lactating can be induced by their use. Greenway suggests that the plants he mentions may have some action on the hormones which control lactation.

THE EFFECT OF VENOUS STASIS ON BONE REPAIR

THE acceleration of bone growth in conditions of venous stasis, clinical as well as experimental, is discussed by Herman E. Pearse and John J. Morton [4] in the first issue of a new American journal which we have already had occasion to notice.[5] The association between chronic cardiac and pulmonary disease and bone changes in the fingers—the well-known club-fingers—has long been recognised, and Pearse and Morton mention various local circulatory changes associated with hæmangiectasis, arteriovenous aneurysm, and meningioma which have been held responsible for overgrowth of bone. They have conducted experiments on dogs by which they claim to have demonstrated a direct acceleration of bone repair in artificially-produced defects in the fibula by ligature of the popliteal vein. These experiments were first described in 1930, but since they were challenged by J. A. Key and F. Walton, further work has been undertaken. Pearse and Morton have now done 28 experiments on dogs' fibulæ, and these have shown an increase in the rate of healing in 25 on the side with venous congestion. The progress of repair is controlled by X ray examination. Great care is necessary to maintain the continuity of the periosteum, as failures in bony union occur if muscle is allowed to interpose between the fragments. Bleeding is avoided by approaching the fibula through the plane of the intermuscular septa, and care is needed to distinguish the popliteal vein, which it is intended to ligature, from the lesser saphenous vein. The requirements laid down by Pearse and Morton for these experiments are that post-operative splinting shall be avoided, that functional disability shall be minimised, and that damage to the circulation shall be absent. Failure to reproduce their results are attributable, in their opinion, to some imperfection of technique. They have found, however, that repair of bone in young animals is so rapid that it is difficult to accelerate it further, and this also may account for certain anomalies. The object of this study was to explain the clinical results reported by other observers, and to suggest that venous stasis has a place in the treatment of fractures in the human subject.

THE CHEMOTHERAPY OF STREPTOCOCCAL INFECTIONS

A FLOW of literature dealing with the therapeutic use of Prontosil and sulphonamide is now in full current. What is more particularly needed at the present stage is guidance on such matters as dosage, the type of preparation to be used, and the effect to be expected in different types of infection by *Streptococcus pyogenes*. A solid contribution on these lines is made by Long and Bliss [1] of the Johns Hopkins Hospital, Baltimore, who have treated 70 cases of such infection involving various parts of the body. Among these there were 4 deaths, two being cases of Ludwig's angina, one a septicæmia in extremis, and the fourth an infant with peritonitis. The recoveries included 22 cases of erysipelas and cellulitis, 27 of acute infections of the upper air-passages, including 8 of scarlet fever, 9 cases of otitis media, and smaller numbers of septicæmia, puerperal fever, and other miscellaneous conditions. Long and Bliss are convinced of the efficacy of the treatment. They have used both prontosil injections and oral sulphonamide; their dosage is heavy (up to 5 grammes of the latter daily), and they report few signs of toxic action, including only three examples of sulphæmoglobinæmia. That an adequate concentration of the drug can be maintained continuously in the blood and tissues by present methods of administration is indicated by the useful work of Marshall, Emerson, and Cutting,[2] who have studied the absorption, in-vivo distribution, and excretion of sulphonamide given either by injection or by the mouth. This is a straightforward pharmacological study of a kind which is apt to find a too belated place when enthusiasm for a new remedy outstrips the orderly progress of its study. The investigations, which were carried out in dogs, show that whether the drug is given by the mouth, by subcutaneous injection, or intravenously, a high concentration is maintained in the blood for six hours and diminishes only slowly, owing to the very gradual onset of elimination in the urine. It was likewise shown that a concentration

[3] *E. Afr. med. J.* February, 1937, p. 346.
[4] *Surgery*, 1937, **1**, 106.
[5] *Lancet*, March 13th, 1937, p. 640.

[1] Long, P. H., and Bliss, Eleanor A. (1937) *Arch. Surg.* **34**, 351.
[2] Marshall, E. K., Emerson, K., and Cutting, W. C. (1937) *J. Amer. med. Ass.* **108**, 953.

equivalent to about half that existing in the blood is attained in the cerebro-spinal fluid, a fact of great importance in relation to the possible treatment of streptococcal or meningococcal meningitis.

Another aspect of research on these drugs is concerned with their effect on bacteria other than streptococci. It will be recalled that Dr. G. A. H. Buttle and his colleagues recently reported in this journal [3] experiments from which it appears that sulphonamide has a remarkable action, in mice, on infection by typhoid and paratyphoid bacilli, and lesser degrees of effect in infection by a number of other bacteria. Among these was the pneumococcus, and the findings in connexion with this organism were distinctly less encouraging than those reported by Rosenthal.[4] There is a discrepancy here which has yet to be explained, and for the time being a proper inclination would be rather to accept the results of the more experienced workers in this field. On the whole it seems advisable for the present not to build serious hopes on these wider explorations: there is no shorter road to discredit of any drug than its indiscriminate use. Sulphonamide cannot be expected to do everything, and the detailed knowledge of antiseptic action which has been accumulating for years all points to a curious specificity among the most active agents we possess, some bacteria being highly susceptible and others comparatively resistant. Now that effective chemotherapy is shown to be possible in at least one bacterial infection, it may be that altogether other chemical weapons will be forged with which to combat others.

INSTITUTE OF CHILD PSYCHOLOGY

Too much stress is sometimes laid, in psychological work with children, on the prevention and treatment of neurosis—i.e., on pathology rather than on normality. The Institute of Child Psychology believes in an approach based upon an intimate knowledge of all aspects of childhood, a direct study of the children themselves. Its staff have worked out some interesting methods peculiar to the Institute for treating children suffering from all kinds of disturbances of their emotional life, from chronic physical disorders, from maladjustment at home or at school, and from educational difficulties. One of their most successful methods is play therapy. They are concerned to make their methods available for other centres and to standardise them for general use. The report for the past year says that great progress has been made in classifying and consolidating these methods and there is evidence that much interest is being aroused in them. The staff also accumulate the knowledge they acquire about the reaction of children to life. In May the first number of the Institute's News Bulletin appeared, and the bulletin is now self-supporting at a nominal annual subscription. Two group discussion meetings were held and courses of public lectures were well attended. During the autumn, members attended a course of lectures by Prof. R. G. Collingwood on the study of fairy tales. The Institute sends its play therapists to a special clinic at the West End Hospital where children are treated for night terrors, anxiety, speech difficulties and other disorders of health and conduct. A special department treats children individually instead of in groups and provides useful training for physicians who wish to learn the psychotherapy of childhood. Children are examined for physical ailments in a medical department and an effort is made to give them the treatment they need. The educational department collects and coördinates school reports, arranges special coaching and studies the relationship between emotional inhibition and freedom to use the intelligence. The social worker dealt last year with 130 cases, including the heavy work of after-care, and of finding suitable help for children who could not be treated at the Institute. Another department cares for the physical re-education of children by rhythmic exercise. Parents are welcomed at the institute, which recognises their importance in the child's problems and encourages them to deal with their own. A generous donor has promised to buy the Institute a larger house as soon as it can find a suitable building.

[3] *Lancet*, March 20th, 1937, p. 681.
[4] Rosenthal, S. M. (1937) *Publ. Hlth Rep., Wash.* **52**, 192.

THE PHOSPHATASES

THE phosphatases are assuming a steadily increasing significance in several departments of physiological and medical research and papers on the subject are multiplying rapidly. As usual these find their way into a wide variety of journals, not all of which are readily accessible to medical workers. Mr. S. J. Folley, Ph.D., and Prof. H. D. Kay [1] of the National Institute for Research in Dairying, Reading, have performed a useful service by summarising in tabular form what is known about the properties of the various phosphatases, their distribution in mammalian tissues and fluids, and the changes which they exhibit in natural or experimental disease. They have compressed a great deal of information into a surprisingly small space and their review should be very helpful to anyone who is seriously interested in these enzymes.

[1] The Phosphatases, Tabulæ Biologicæ Periodicæ (W. Junk, The Hague), 1937, **12**, 268–279.

JOHN BLAND-SUTTON

As a supplement to the *Journal of Obstetrics and Gynæcology of the British Empire* for the April issue there is published a biographical essay on John Bland-Sutton written by his colleague and close friend, Sir Comyns Berkeley. The story, admirably told, wanted telling in detail, because Bland-Sutton's career—his successes and set-backs, his friendships and animosities—was sometimes puzzling even to his friends. This record, a full and moving one, while setting out in a coherent manner its subject's personality, gives interesting pictures of professional and hospital organisation at the different epochs. Cooke's popular private school of anatomy was flourishing in the 'seventies, and Bland-Sutton attended it and was invited to be the demonstrator. But he refused the post, tempting to an impecunious student, and offered himself, with 100 sovereigns in a bag, as a perpetual student at Middlesex Hospital. He joined as a prosector, for his work at Cooke's school had been thorough, and throughout all the earlier stages of his career at Middlesex he was teaching and coaching his contemporaries. This precocious position as instructor explains the simplicity and directness of his writings and public utterances—he had taught himself to give prominence only to the things that mattered, and to provide explanations that could be followed at once. He won all the prizes at the hospital for which he competed but was unable to take a house surgeon's post, because not only was it an unpaid appointment but it necessitated the disbursal of a fee. He became instead assistant curator of the hospital museum, and worked so well that he was offered more important posts of a similar kind. These he refused, concentrating

on his aspiration to the surgical staff of the hospital. This materialised, and Bland-Sutton's election as assistant surgeon was noticeable for two things. First he had never been an interne, and secondly, he was actually the first man trained at the Middlesex Hospital to be elected to the surgical staff of the hospital, the practice hitherto having been to draw for the staff from other and larger schools.

Bland-Sutton's life was epitomised in an obituary notice in these columns. The fuller chronicle will be read with pleasure, for not only is the story a very interesting one, but a vivid picture is presented of the changes that have taken place in medical education and hospital organisation since Bland-Sutton was a student.

THE MEDICAL ANNUAL

WE always welcome the Medical Annual,[1] and it continues to deserve its welcome. It is in the main, of course, a set of summaries of the previous year's most important practical papers in the world's medical literature, prepared by a number of able and distinguished contributors. But it avoids, with conspicuous success, the dull stodginess of most volumes of abstracts. This is partly because its contributors are free to select, being under no obligation of comprehensiveness, and partly because they know and understand the readers for whom they write—namely, those general practitioners who are still willing to learn what is new and good in medicine and eager to give the benefit of it to their patients. The result is, in most of the articles, an easy clear and friendly style, closer to conversation than to the language of the text-book, and this, with the reviewers' skill in presenting new things in their relation to what is already familiar, gives the manual a character and an atmosphere of its own; it is not merely a work of reference—one can enjoy spending an evening reading straight through it. The editors have the impression that last year was a year of steady advance in many fields, without spectacular achievements, and they remark that the tendency continues for the clinical and the laboratory aspects of medicine, no longer incompatibles, to become properly compounded in the doctor's mind and practice. That process is no doubt slow, but it needs judgment and a sense of proportion, qualities which make the Medical Annual's own contribution to it a very useful one.

THE TREATMENT OF ADDISON'S DISEASE

DESPITE great advances in our knowledge of the function of the suprarenal glands, the treatment of Addison's disease remains very unsatisfactory. This is the more depressing since both the preparation of the cortical hormone, and the discovery of the rôle of salt, held out great promise of therapeutic application. The reasons, however, are not far to seek. In the first place, as Borst and Viersma[2] point out, failure is naturally to be expected if the Addisonian syndrome has been caused by generalised tuberculosis which in itself would ultimately have proved fatal. A second difficulty to which they also allude has been the failure of manufacturers to supply cheap, standardised preparations of the hormones. A third difficulty is the seemingly manifold action of the cortical hormone or hormones. This is brought out by Grollman[3] and by other investigators. The arterial blood pressure, inorganic salt metabolism, carbohydrate metabolism, renal function, absorption from the intestine,[4] resistance to infections, hæmorrhage and toxins all seem to be implicated: and no one knows at present the relative amounts of the hormone or hormones required to restore each or all of these functions to normal. Add to this the possibility of variations in the patient's own resistance or reaction, and the explanation of the therapeutic failures is complete. The case described by Dr. Anderson and Dr. Lyall in our present issue illustrates the difficulties that attend treatment. This patient, who had been rescued from almost certain death from collapse and salt deficiency in March, 1936, by cortical hormone and salt, died, apparently from spontaneous hypoglycæmia, in October of the same year.

It is clear that once the diagnosis of Addison's disease has been made the prognosis must still be guarded. It is also clear that haphazard treatment is never likely to be permanently successful, and that the best hope for these patients lies in making a full investigation of their syndrome at frequent intervals, and in varying their treatment from time to time in accordance with the findings.

THE BRITISH ASSOCIATION

NOTTINGHAM is the place, and Sept. 1st–8th the time, of this year's meeting of the British Association. The president is Sir Edward Poulton, F.R.S., and his inaugural address will deal with the history of evolutionary thought as recorded in the meetings of the association. Medical men who preside over sections are Prof. F. A. E. Crew (Zoology) and Dr. E. P. Poulton (Physiology); Prof. H. Hartridge, F.R.S., will give a public lecture on illusions of colour. Among very many subjects of interest to medical men are: chemistry and medicine, the changing distribution of population, the contribution of physiology to the health of the individual and the community, tests for colour defect, recent advances in genetics and cytology, problems of child guidance, air-conditioning, high-altitude flying, and the relation of grass to the national food-supply. Mr. H. G. Wells presides over the section of educational science and will speak on the informative content of education. Further particulars and the provisional programme may be had from the secretary at Burlington House, London, W.1.

THE annual meeting of the British Medical Association will open at Belfast on July 16th, under the presidency of Prof. R. J. Johnstone, F.C.O.G. The council of the Association have recommended that Dr. Colin Lindsay be elected president for next year's meeting which will be held at Plymouth.

THE ROYAL EYE HOSPITAL.—A clinical society has been organised in connexion with this hospital. The next meeting of the society will be held on Tuesday, May 4th, at 6 P.M., at the hospital, when Dr. T. Rowland Hill will read a paper on "neuromyelitis optica," illustrated by cases. All medical practitioners will be welcome. For further particulars apply to the hon. secretary, J. Minton, Royal Eye Hospital, Southwark.

[1] Medical Annual, 1937. Edited by H. Letheby Tidy, M.A., M.D. Oxon., F.R.C.P., and A. Rendle Short, M.D., B.S., B.Sc., F.R.C.S. Bristol: John Wright and Sons. London: Simpkin Marshall. Pp. 705. 20s.

[2] Borst, J. G. G., and Viersma, H. J. (1937) *Acta med. scand.* 91, 127.

[3] Grollman, A. (1936) The Adrenals, London.

[4] Verzár, F., and McDougall, E. F. (1936) Absorption from the intestine, London.

SPECIAL ARTICLES

ALUM-PRECIPITATED TOXOID IN DIPHTHERIA PREVENTION

BY J. C. SAUNDERS, M.D. N.U.I., D.P.H.
MEDICAL OFFICER OF HEALTH, CORK

THE work to which these notes relate was undertaken in order to test the possibility of immunisation by a single injection and may be regarded as a sequel to previous work (Saunders 1932) in which multiple doses of alum-precipitated toxoid (A.P.T.) were used. The reactions experienced were discussed in a subsequent article (1933), and arising from the fact that in a series of 579 children four sterile abscesses had developed, it was deemed advisable to suspend the issue of this prophylactic while further laboratory investigation was carried out with a view to producing a purer A.P.T., which would be less liable to cause unpleasant reactions and (if possible) free from the liability to produce abscesses. The A.P.T. used by us up to this point was that produced in the Wellcome Research Laboratories according to the method of Glenny and Barr (1931). Personally, I was quite satisfied with the results obtained, particularly in the immunising efficiency of the product, but those in respect of reactions were not regarded as so satisfactory by the laboratories and the result was the temporary suspension of supplies.

PRESENT PROCEDURE

The period covered by this earlier work was from June, 1931, to December, 1932, and it was not until December, 1934, that further supplies of A.P.T. were received. A description of the method of preparation will appear in another communication from the Wellcome Laboratories.*

The period covered by the present work extends from that date to December, 1936, and the procedure adopted was as follows:—

1. Children under 7 were not subjected to a preliminary Schick test. They received 1 c.cm. of A.P.T. on the first visit and were instructed to attend again in five weeks for test.

2. Children over 7 received, on first visit, concurrent Schick and Moloney tests. The dilution of toxoid used for the Moloney test was 1 in 100 and readings were made in three to four days afterwards. The disposal of these cases was as follows: (*a*) Schick negative—no treatment; (*b*) Schick positive and Moloney negative—1 c.cm. of A.P.T. (retest in five weeks); (*c*) Schick positive and Moloney positive—1 c.cm. of floccules (T.A.F.) repeated in two weeks and retest in five weeks.

All prophylactic injections were given by the subcutaneous route.

The majority of children under 7 are susceptible to diphtheria and it was felt that the exclusion of the preliminary test reduced injections to the minimum. Indeed the great virtue of immunisation by A.P.T. reposes in the claim that it is possible to protect children by a single dose, and if this claim can be substantiated a big advance has been made. In my experience no method involving the use of multiple injections can hope to achieve complete treatment for all cases attending, and it will be found that when the final tabulation is made considerable leakage has taken place. In our case failures to complete treatment varied from 32 per cent. in 1932 to 8·8 per cent. in 1933. In 1935—the first complete year in which A.P.T. was used—the leakage was calculated to be only 0·72 per cent. A defection rate of 32 per cent. is serious and any scheme characterised by such figures must be written down as a failure. The main, if not the only, cause of such failures is the objection inherent in so many people to hypodermic injections, and the reduction of such injections to the lowest possible minimum is therefore most desirable, especially if it can be shown that there is no reduction in the degree of protection conferred.

The group dealt with here comprised originally 3189 children, including 398 who were found to be negative to the preliminary Schick test and did not require treatment, and 634 others who received treatment but failed to come for the final Schick test. There is, therefore, a residual group of 2157 who received treatment and were Schick-tested after it, and it is this group which is concerned in the analyses which follow.

Results of Treatment

It was decided in the first instance to review the results of the Schick test as a whole without any reference to the period that had elapsed between treatment and test, and the result is set out in Table I. With regard to the first age-group (0–2 years) it has to be stated that the great bulk of the children were over 18 months, as it was only in exceptional instances that we treated children under this age. The proportion of *negative* reactions varied from 99·4 per cent. (in the 4–6 group) to 93·1 per cent. (over 10), but in the latter group the number of children is so small that the resulting figures become unreliable. Taking the group as a whole, it is found that after treatment 98·7 per cent. of the cases yielded negative reactions, which is at least as good a result as could possibly be hoped to be obtained with any prophylactic of the multiple injection type.

TABLE I

Final Results of Schick Tests after Treatment

Age-group.	Cases.	Schick test.		Proportion negative (per cent.).
		Positive.	Negative.	
0– 2 ..	446	7	439	98·4
2– 4 ..	889	5	884	99·4
4– 6 ..	516	5	511	99·0
6– 8 ..	224	2	222	99·1
8–10 ..	66	5	61	93·9
Over 10 ..	16	1	15	93·1
Total ..	2157	25	2132	98·7

The question, of course, arises about the Schick conversion rate—i.e., the proportion of cases that have been converted from Schick positive to Schick negative. As stated above, primary tests were not performed in children under 7, who comprise the great bulk of the cases, and consequently a direct answer cannot be given in their case; but it is possible to adduce at least approximate figures. Since 1929 over 4000 children in Cork have been subjected

* The materials used by us throughout were supplied by the Wellcome Research Laboratories, Beckenham, and I am indebted to Dr. R. A. O'Brien, the director, for supplies sent gratis in the earlier stages of the investigation. Four different batches were used, the Lf value of which varied from 20 to 50.

TABLE II—RESULTS OF SCHICK TESTS AFTER TREATMENT

Analysed according to Interval between Treatment and Testing

Age-group.	Cases.	RESULTS OF SCHICK TESTS.														
		5 weeks.			6 weeks.			7–9 weeks.			10–12 weeks.			Over 12 weeks.		
		Pos.	Neg.	Per cent. Neg.	Pos.	Neg.	Per cent. Neg.	Pos.	Neg.	Per cent. Neg.	Pos.	Neg.	Per cent. Neg.	Pos.	Neg.	Per cent. Neg.
0– 2	446	7	188	96·4	—	93	100	—	55	100	—	33	100	—	70	100
2– 4	889	2	335	99·4	1	198	99·4	1	134	99·2	—	85	100	1	132	99·2
4– 6	516	3	199	98·5	2	100	98·0	—	69	100	—	40	100	—	103	100
6– 8	224	1	92	98·9	—	38	100	1	33	97·0	—	19	100	—	40	100
8–10	66	4	29	87·8	—	14	100	1	6	85·7	—	4	100	—	8	100
Over 10	16	1	6	85·7	—	—	—	—	4	100	—	1	100	—	4	100
Total ..	2157	18	849	94·4	3	443	99·3	3	301	99·0	—	182	100	1	357	99·4

to the *primary* Schick test and it has been found (Ann. Rep. 1935) that the proportion of positives has varied from 78·2 per cent. in 1929 to 44 per cent. in 1935. Differential analyses (according to age-groups) have been made since 1932 and the proportion of positive reactors in 0–5 years group has varied from 88·4 per cent. in that year to 66·6 per cent. in 1935, and the corresponding variation in the 5–10 years group from 60·1 to 49·5 per cent. We may assume, therefore, that about 66 per cent. of the 1851 children who comprise the first three groups of our present series—i.e., 0–6 years—were positive before treatment. This gives us a hypothetical group of 1224 Schick-positive children of whom (from Table I) 17 remained positive to the secondary test. Thus we have a conversion rate of 98·6 per cent., which is the same figure as the proportion of negative tests yielded by the whole group.

A further analysis was made according to the period elapsing between treatment and test. The result is shown in Table II. In all cases an effort was made to get the children to attend for the test at the end of *five* weeks; 849 of them did so. It will be noted that no less than 94·4 per cent. were negative at the end of this relatively short period. If one excludes the two last groups (8 years and upwards) in which the figures are again very small the result is even better, the proportion of negatives then varying from 99·4 to 96·4 per cent. This is important. It indicates a very high conversion rate in a very short time. As we proceed to the longer time periods we note a more or less progressive improvement in which the proportion of negative reactions is never less than 99 per cent.

These results are much better than we had previously experienced with toxoid-antitoxin (three injections), the highest negative rate being 89·5 per cent. at a ten months interval (1932), and better also than those obtained in a group of 1081 children treated by us in 1933–34 with potent formol-toxoid (two injections). In this case the proportion of negatives on retesting was 96·8 per cent. (work not published). The nearest approach we have had to such figures was with the earlier batches of alum-toxoid that I previously reported (1932), but in that case multiple injections were used. It would hardly be surprising if such figures as these now reported induced some degree of scepticism and, indeed, more than once during the course of this work I have felt inclined to call in question the potency of the toxin used for the Schick test, but any uneasiness on that score was allayed by the results of the *primary* tests which were carried out concurrently. The reactions which presented themselves were in every way normally developed among this class. The great majority of the readings were made by myself and such as I did not see were read by my assistant, Dr. P. F. FitzPatrick, who has had considerable experience in this work.

OTHER WORKERS' RESULTS

It is clear, therefore, that in this area a single dose of A.P.T. has been very effective as an immunising agent, and it remains to be seen how the results obtained compare with those in other places. Some of these are shown in Table III.

Isabolinski, Judenitsch, and Lewzow (1935) also describe interesting results obtained in guinea-pigs in which the treated animals were found to be resistant to 600 m.l.d. of diphtheria toxin. Kositza (1935), comparing the results obtained with toxin-antitoxin, formol toxoid (F.T.), and A.P.T. (see Table III), concludes that A.P.T. gives a higher percentage of immunity than F.T. in eight to nine weeks after treatment, but that the immunity conferred by the latter is more enduring. Leach (1935) describes the results of field immunisation carried out in rural districts in Austria and experiments to determine the relative merits of different antigens. He believes that unless "depôt" material is present even high value toxoid has inferior immunising powers. It was found that 60 per cent. of the antigen was eliminated by the kidneys in twelve hours. This author's findings confirm the earlier work of Glenny (1930) and are confirmed by those of Schmidt-Burbach (1936) who describes experiments on groups of guinea-pigs which were immunised in parallel with crude formol-toxoid, Al $(OH)_3$ formol-toxoid, and A.P.T. (prepared by the method of Glenny and Barr (1931)). The latter two antigens were found to be much superior to F.T. and the better results are ascribed to the absorption of the antigen and its slow subsequent release during immunisation. According to this author both the alum preparations gave rise to fewer undesirable reactions than crude toxoid.

In regard to animal experiments special reference has to be made to the important work of Faragó (1935a) in which is described the results of inoculation of guinea-pigs with A.P.T. and the subsequent operative removal of the indurated tissue and its reinjection into other guinea-pigs. By this method the author was able to show that even thirty-eight days after injection such tissue gave evidence of containing antigen. Estimations of the alum content of the tissues at the site of injection showed that the content remains practically unchanged for thirty-two days after injection. The longer the time the antigen was left in situ the longer the antitoxin titre is maintained at high level. These results suggest that an antigen

injected in relatively insoluble form serves as both primary and secondary antigenic stimulus or indeed, rather, acts as a continuous stimulus. Elsewhere (1935b) the same author describes field work in Hungary with A.P.T. on a large scale (see Table III).

TABLE III

Effect of A.P.T. (Single Dose)

Authors.	No. treated.	Age.	Original Schick status.	Interval before testing.	Immunity-rate per cent.
Baker and Gill (1934).	1414	—	Not kn.	2–3 ms.	99
McGinnes and Stebbins (1934).	2000 approx.	—	Positive.	2 ms. and 1 yr.	90
Walker (1934).	A 135	6–18 ms.	Not kn.	2–6 ms.	100
	B 165	7–12 yrs.	Positive.		
	C 770	Under 1 yr.	Not kn.		
	D 992	1–6 yrs.	,,		
Keller and Leathers (1934).	A 23	—	—	2 wks.	60
				4 ,,	95
				6 ,,	100
	B 53	—	—	Similar.	Similar.
Isabolinski, Judenitsch, and Lewzow (1935).	245	—	Positive.	6½ wks.	96·8
Murphy (1935).	131	—	—	5 ms.	93·1
Haine (1935).	1160	5–14 yrs.	Not kn.	9 wks.	90
Naughten, White, and Foley (1935).	A 130	—	Positive.	—	—
	B 240	—	Not kn.	2 ms.	90–95
Underwood (1935).	152	—	Positive.	1 m.	83·6
Kositza (1935).	A 175	—	Positive.	1½–3 ms.	91·4
	B 335	—	,,	8–9 wks.	86·3
Faragó (1935).	2652	—	—	2 ms.	93·3
				1 yr.	93·7 (of 2379)

kn. = known. ms. = months.

The authorities so far quoted have expressed favourable opinions in regard to the value of A.P.T., but not all observers have been so favourably impressed.

Frazer and Halpern (1935) in comparing the antitoxin response to one dose of A.P.T. and three doses of unmodified toxoid found that the response to the latter was distinctly greater than to the single dose of A.P.T. In the A.P.T. group, after 10 weeks 62 per cent. had more than 1/100 unit of antitoxin per c.cm. Whereas of the toxoid group 91 per cent. had more than 1/100 unit per c.cm. After 1 year only 19 per cent. of the A.P.T. group remained above 1/100 unit (cf. findings of Faragó referred to above) while 91 per cent. of the toxoid group remained above that level. Lai (1935) obtained only 62·6 per cent. conversion rate after 5 months in 359 previously Schick-positive children, but, in this case, it is possible that the poor result was due to using an antigen of low immunising power (9 Lf). Pansing and Schaffer (1936) investigated the duration of immunity in groups of children who had received a single dose of A.P.T. In the first group 462 positives were retested 28 days after inoculation and 84 per cent. were found negative. The second group consisted of 445 positives retested after 60 days in which 86 per cent. had become negative. The third group comprised 549 children who had been given 1 c.cm. of A.P.T. and subsequently found Schick negative. They were retested at the end of 2 years and 42·2 per cent. only were found to be still Schick negative. In a smaller series of cases Parish (1936) compared the results after two injections and one injection respectively of A.P.T. In the former case an immunisation rate of 100 per cent. was obtained as compared with 64 per cent. in one instance and 81 per cent. in another in the case of single dose A.P.T. He draws attention to the low natural Schick-negative rate (17·5 per cent. to 20 per cent.) in the communities with which he was dealing and considers that such communities are not suitable for treatment by the single-dose method. Recently Bousfield (1936) drew attention to an extremely low conversion rate (37 per cent.) obtained by him in a small group of children treated with 1 c.cm. of A.P.T.

It is possible that the explanation of the discrepancy that appears to exist in the findings of different workers with A.P.T. may be found in differing natural immunity rates. Variations may also be due to differences in the "antigenic quality" of the preparation and in the strength and purity of the antigen. There certainly has been a striking change in the natural immunity level of children in Cork over a number of years.

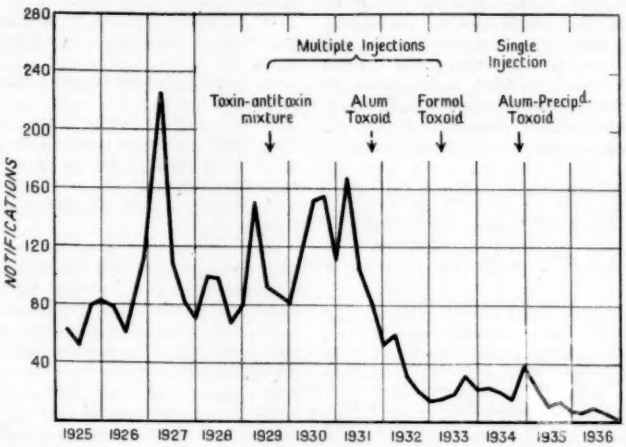
Of 1170 children (all ages) submitted to primary Schick testing in 1929–30 there were 78·2 per cent. of positives, whereas in 1934 when 1474 were similarly tested the proportion of positives had fallen to 44 per cent. Differential analysis according to age-groups carried out since 1932 has shown all groups to be affected in the change, but it has been most pronounced in the 0–5 years group (88·4 per cent. to 66·6 per cent.). In the group over 10 years the proportion has declined from 37·7 per cent. to 30·3 per cent.

For some reason, therefore, the natural immunity rate of children in this area has been considerably raised and now stands at a comparatively high level which, according to the views of Parish and others as set out in a leading article in the *British Medical Journal* (1935), is a favourable indication for the use of A.P.T. by the single-dose method and may possibly explain why we have obtained such good results by this method in Cork. But it does not explain the comparable figures obtained in many other areas as outlined above and I am inclined to believe that those who have had a considerable experience of A.P.T. in actual field work will probably continue to use it among suitable groups of children.

EFFECT ON DIPHTHERIA IN CORK

In my original article on the subject (1932) I expressed the opinion that alum-toxoid (A.M.T.) was superior to toxoid antitoxin mixture (T.A.M.) in the prevention of diphtheria, that it induced immunity more rapidly, and that in epidemic periods, when rapid induction of immunity is essential, it was the best antigen. Our experience of epidemic diphtheria in Cork has afforded a unique opportunity of testing the truth of these assumptions and I believe they have been verified by the facts. Reference to the diagram makes what follows easier to comprehend. It is a graphical record of diphtheria notifications (by quarters) from 1925 to the end of 1936, showing the introduction of T.A.M. in June, 1929, A.M.T. in June, 1931, and continued until December, 1932, when it was temporarily suspended. F.T. was introduced in March, 1933, and finally A.P.T. in December, 1934. Although there was a considerable abatement in the severity of the epidemic after 1931 the real decline set in in 1935 and is clearly shown in the graph. In my opinion the main factor here was the large number of children (particularly of pre-school age) whom we were able to immunise by the single-dose method. Very similar figures to these were adduced by Prof. B. Johan at the second International Congress for Microbiology in London in July, 1936, in relation to diphtheria incidence in Hungary. He showed tables and diagrams illustrating the pronounced reduction in the incidence in certain areas after the introduction of A.P.T. Prof. Johan advanced as one of the reasons for the failure of anatoxin to stem the tide of epidemic diphtheria in the affected regions the fact that quite large

proportions of children failed to present themselves for subsequent treatment after the first injection (see *Lancet*, 1936, **2**, 277). This will probably have been the experience of most people using the multiple-dose method. It certainly has been ours in spite of intensive following up. In the present series no less than 634 children failed to come for the final test. This represents the considerable proportion of 22·3 per cent. and in a scheme involving more than one injection such cases would have to be written off as failures so far as induction of immunity is concerned. In this respect, therefore, it is clear that A.P.T. marks an important advance in diphtheria prophylaxis and if it can be shown that a reasonable degree of protection is induced by a single dose, this prophylactic should play an especially important part in combating epidemic diphtheria when rapid and widespread protection becomes an urgent necessity.



Notifications in Cork City before and during immunisation with different agents.

Reactions

The reactions experienced with this lot of A.P.T. have been definitely less than with the older batches used some years ago, and this is especially so in regard to abscess formation. Our procedure was to instruct parents to report again in the course of three or four days if there was any anxiety on the score of sore arms or general sickness. Very few of them did so. In addition, when the children reported for the Schick test specific inquiries were made on these two points and where positive histories were forthcoming further more careful questions were put about the nature and extent of the reactions and from the information thus gained Table IV was constructed. The standards used were those adopted previously when using alum-toxoid :—

1. *Slight.*—Local reaction not exceeding 1 in. in diameter, either with or without slight malaise.

2. *Moderate.*—Local reaction 1–4 in. in diameter with or without malaise.

3. *Severe.*—Any local reaction exceeding 4 in. in diameter with or without general reaction.

It is necessary to allude again to the fact that in this area these reactions are not regarded in the serious light that they appear to be in England, and consequently the findings must be taken with a certain amount of reserve, especially when reliance has had to be placed on the views of parents, but it has nevertheless been remarkable what a very large proportion of mothers have been quite emphatic on the point that there were no reactions. It will be noticed that records of reactions of *all* sorts total 14·5 per cent. and that approximately 7 per cent. were mild, 5 per cent. moderate, and 3 per cent. severe. It will also be noted that the tendency to develop reactions was more marked in the older groups in spite of the selection of cases through the Moloney test. These results are a distinct improvement on those obtained in the earlier investigation (Saunders 1933) in which it was shown that reactions were experienced in as high proportions as 36 per cent. and 56 per cent. with different batches. In 5 cases, in all of which the reaction was classed as "severe," late development was noted. That is, the first signs of inflammation were not noted until 6 or 7 days after the injection. Mottling was a characteristic feature of the inflammation in these cases. In 5 cases swelling, without inflammation, was noted. In these there was uniform swelling of the subcutaneous tissues of the outer aspect

TABLE IV

Analysis of Reactions

Age-group.	Cases.	Type of reactions.						Total.	Per cent.
		Mild.	Per cent.	Moderate.	Per cent.	Severe.	Per cent.		
0–2	446	20	4·4	6	1·3	4	0·9	30	6·2
2–4	889	56	6·2	33	3·7	12	1·3	101	11·3
4–6	516	42	8·1	36	6·9	21	4·0	99	17·0
6–8	224	19	8·4	18	8·0	14	6·2	51	22·7
8–10	66	12	18·1	8	12·1	9	13·6	29	45·4
10 and over	16	1	6·1	—	—	2	12·2	3	18·7
Total..	2157	150	6·9	101	4·6	62	2·8	313	14·5

TABLE V

Relation of Moloney Tests to Reactions

Age-group.	Cases.	Tests.	Case with reactions, and proportion of Moloney negatives (M.ve).						Test failed.
			Mild.	M.ve.	Moderate.	M.ve.	Severe.	M.ve.	
6–8	224	75	19	6	18	5	14	3	14 (18·6%)
8–10	66	62	12	10	8	8	9	9	27 (43·5%)
10 and over	16	16	1	1	—	—	2	2	3 (18·7%)
Total ..	306	153	32	17	26	13	25	14	44 (28·1%)

of the upper arm but no sign of inflammation whatever. The swelling in such cases subsided in the course of a week. In none of 313 cases reported as having had reactions was there anything which gave rise to the slightest anxiety.

We did not find the Moloney test entirely helpful in picking out children who would not be likely to develop reactions with the prophylactic. As stated above all children over 7 were submitted to it and 670 such received the test. Of this number there were 286 Schick positives who yielded 153 Moloney negatives and these were treated with A.P.T. The results as regards reactions are shown in Table V. In 28 per cent. reactions of varying degrees occurred.

ABSCESSES

In this series there has been a remarkable freedom from abscess formation. Of the 2791 children who received injections of A.P.T. only one case came under our notice.

This was a child, aged 5, who was brought by her mother three weeks after inoculation and then presented an abscess over the site of injection. Arrangements were made for treatment on the following day but it appears that the abscess "broke" itself that evening and the mother did not bother to take the child to hospital. The arm then healed spontaneously and when seen recently the child was perfectly well.

Apart from this case there has been a complete freedom from abscess formation. This is important as it seems to indicate that the makers have been largely successful in their efforts to produce an A.P.T. which would be free from this unpleasant side effect. In our earlier series there were 4 abscesses among 579 cases (0·7 per cent.). The results of other authorities are as follows:—

	Cases.	Abscesses.	Per cent.
Kositza (1935) ..	2013	19	0·9
Lai (1935)	489	1	0·2
Murphy (1935) ..	363	3	0·8
Naughten (1935) ..	370	1	0·3
Shafton (1936) ..	101	25	25

Faragó experienced 0·01 to 0·3 per cent. in his series and Baker and Gill refer to light abscesses in about 0·04 per cent. of a series of over 16,000 inoculations. Shafton's remarkable proportion is altogether exceptional and may be due to the presence of irritating non-specific material in his toxoid.

INDURATION

It may be said that every case treated with A.P.T. develops induration in some form. Every case examined by us within five weeks presented it. Varying degrees of size and hardness were experienced. In the great majority of cases the condition presented itself as a hard rounded mass, about 0·5 to 1 cm. in diameter, lying in the subcutaneous tissues and freely movable. In some instances the form assumed was that of a small plaque varying in size from that of a shilling to sixpence. These indurations were not so permanent as those experienced in our earlier series and had disappeared in the majority of the cases seen after twelve weeks. In this respect, also, the antigen has been an improvement on the earlier batches.

Summary

1. A report is given of 2791 children treated with a single dose (1 c.cm.) of A.P.T.

2. Of this number 2157 were Schick-tested at varying periods after treatment and 98·7 per cent. yielded negative reactions.

3. Of 849 children who were tested in five weeks 94·4 per cent. were negative.

4. Of 443 children tested at six weeks 99·3 per cent. gave negative reactions.

5. At periods over six weeks in all cases the proportions of negative reactions were over 99 per cent.

6. A probable conversion rate of 98·6 per cent. is assumed.

7. The proportion of cases who developed reactions was small (14·5 per cent. of the total cases examined after treatment). Of these only 2·8 per cent. were classed as severe.

8. In only 1 case was there any question of abscess formation.

9. Simultaneous with the administration of A.P.T. there was a pronounced and apparently permanent decline in the incidence of diphtheria. It is believed that A.P.T. played a significant part in this decline.

10. An alteration in the Schick status of the community has been noted and allusion made to the possibility of a high natural immunity rate playing some part in the good results obtained.

11. It is proposed to submit the cases to a further Schick test after a lapse of three years with a view to determining the permanency of the Schick-negative state as induced by A.P.T.

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MEDICINE AND THE LAW

Death after Ambulance Journey

THE St. Pancras coroner investigated last week a case where a patient, unable to obtain treatment at the hospital to which she was originally sent, died after a 25-mile journey to a second hospital. The deceased, a married woman aged 32, living at Slough, was taken to the King Edward VII Hospital at Windsor; she was due to have a child in about six days. She proved to have a septic infection, and at the inquest a medical witness explained that the hospital regulations do not permit cases of this nature to be retained in the

building, there being no isolation accommodation. There was, he said, an isolation hospital for fever diseases at Slough but it was understood not to welcome cases of puerperal sepsis. The medical officer for Berkshire had an arrangement with the North-Western Hospital in London whereby the latter would receive such cases from the Windsor hospital. The patient was therefore removed to the North-Western Hospital but died within 24 hours of her admission. There was some difference of opinion among the medical witnesses over the patient's condition at the time of the journey. The doctor who examined her at Windsor on that day said she was not then suffering from general peritonitis; if she had been, he would not have sent her away, in spite of the hospital regulations. The pathologist who described the results of the post-mortem examination was of opinion that the infection was present for about four days before death. Asked by the coroner if the removal was desirable or not, he described it as deplorable. The coroner thought this adjective not too strong. He recorded a verdict that the patient died as a result of general peritonitis and that death was due to natural causes; this, he said, was not to imply that he felt satisfied with the removal. This unfortunate occurrence will doubtless lead to a review of the accommodation and arrangements in such emergencies.

Asleep at the Wheel

The Divisional Court has lately allowed an appeal against a stipendiary magistrate's decision that a motorist who had suddenly fallen asleep at the wheel of his car was not guilty of careless driving under Section 12 of the Road Traffic Act. The motorist was tired and, as can easily happen, dozed off; his car swerved and struck two trees by the side of the road. The magistrate took the view that the driver who is overtaken by sleep is in the same position as a person suddenly taken ill and is therefore not responsible for the results. It may be true as a general proposition of criminal law that an act unconsciously committed is not an offence—for instance, if one can imagine a sleepwalker rising from bed and taking his car out on to the highway. The Divisional Court, however, lent no countenance to the view that a motorist who falls asleep at the wheel cannot be convicted of careless driving. The statutory offence under Section 12 is driving a motor vehicle without due care and attention or without reasonable consideration for other persons using the road. A motorist has a duty to keep awake and not to drive when so tired that there is a risk of his falling asleep.

Manslaughter and Negligence

The broader aspects of homicide by dangerous driving were considered by the House of Lords on April 22nd (Andrews *v.* Director of Public Prosecutions) upon a special appeal, by certificate of the Attorney-General, from the Court of Criminal Appeal. The judgment delivered by Lord Atkin analysed the nature of manslaughter and made considerable reference to cases where doctors are accused of professional negligence. Andrews had killed a man on a well-lighted road when overtaking another car. He carried the injured man for a short distance on the bonnet of his vehicle, then ran over him and failed to stop or to report the accident. The offence of murder contains, though not exclusively, the element of intention to kill. The offence of manslaughter, on the other hand, is based mainly on the absence of intention to kill but the presence of an elusive element of "unlawfulness." Where manslaughter is an unintentional killing caused by negligence, what degree of carelessness must be proved? Lord Atkin, tracing the development of the law from the earliest times, observed that at first there are judicial opinions which suggest that death due to any lack of care will constitute manslaughter. "As manners softened and the law became more humane, a narrower criterion appeared." People shrank from attaching the penalty for a felony (formerly a capital offence) to results produced by mere inadvertence. The narrower view, continued Lord Atkin, became apparent in prosecutions of medical men, or men who professed medical or surgical skill, for manslaughter by reason of negligence. He referred in passing to R. *v.* Williamson (1807), where a man who acted as a man-midwife tore away a part of the prolapsed uterus, mistaking it for the placenta. By a mistake in his observation of the actual symptoms, the accused inflicted on the patient terrible injuries from which she died. Yet Lord Ellenborough held that, "to substantiate the charge of manslaughter, the prisoner must have been guilty of criminal misconduct arising either from the grossest negligence or the most criminal inattention." It was on this occasion that Lord Ellenborough made an oft-quoted observation: "if the jury should find the accused guilty of manslaughter, it would tend to encompass a most important and anxious profession with such dangers as to deter reflecting men from entering into it." Lord Atkin then passed to the modern case of R. *v.* Bateman. He cited Lord Hewart's dicta as to the distinction between negligence in a civil case and negligence in a criminal case. Lord Hewart had said that, "in order to establish criminal liability, the facts must be such that in the opinion of the jury the negligence of the accused went beyond a mere matter of compensation between subjects and showed such disregard for the life and safety of others as to amount to a crime against the State and conduct deserving punishment." Lord Atkin was inclined to think that the ideas of crime and punishment do not in themselves help a jury to decide whether in a particular case the degree of negligence amounts to a crime and deserves punishment. But he observed that the substance of Lord Hewart's judgment in R. *v.* Bateman was most valuable and, he thought, correct. In practice it had been adopted by judges in charging juries in all cases of manslaughter by negligence, whether in driving vehicles or otherwise.

The upshot of Lord Atkin's judgment is that recklessness can contain the element of negligence which justifies a charge of manslaughter; recklessness is a specific element in the offence of "dangerous driving" under Section 11 of the Road Traffic Act of 1930; Parliament has since enacted that, on an indictment for manslaughter, a man may be convicted of the lesser offence of "dangerous driving"; recklessness as an element of "dangerous driving" within Section 11 may amount, but by no means necessarily amounts, to the degree of criminal negligence requisite to establish the offence of manslaughter. The medical profession is only indirectly concerned in the penalties for careless or dangerous driving, or in the subtleties of the history of manslaughter. It will, however, appreciate that Lord Atkin in the House of Lords has confirmed the decision of the Court of Criminal Appeal in R. *v.* Bateman, so that there has been no relaxation of the high degree of negligence requisite to justify a verdict of manslaughter.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index.

FROM A MEDICAL ECONOMIST

I

SOME years ago the late Sir Walter Fletcher told me that he had always wondered why it was so impossible for a doctor to discuss medical matters satisfactorily with a layman—"even a very intelligent layman." He expressed the view that the difficulty lay in outlook as well as in knowledge and training. In fact the layman's attitude to medicine is always strictly utilitarian. He looks upon his doctor as a man with a mission to cure disease and is apt to become impatient when other considerations are presented to him. Nor is he tolerant, as a rule, of a practice which excludes personality or individual predilection from its scope. He insists upon being cured as a separate and distinct human being and rejects vigorously the idea that any average therapy can satisfy his needs.

His choice of a doctor is determined by this attitude. He will assure you that he is fortunate in the respect that his medical adviser knows his constitution and has had experience of his family—knowledge and experience to which he attaches quite as much importance as to any professional attainment. Again, he will avoid, if possible, a doctor possessed of a reputation for giving the same drugs to all his patients or advising many of his patients to submit to the same surgical or specialist treatments. His doctor must not prejudge him. Obstinately he refuses to become a mere number in a ledger or upon a bed.

I have heard this attitude described as vanity but, if so, then all men and all women are vain. A more interesting consideration is its merit. Is there, in fact, any substance in the contention of John Smith that he must be treated and cured as John Smith and not as an example of the average man? Again, is John Smith entitled to his view that his doctor must be, if not his friend, at least his father-confessor and familiar? We all repeat the assertion that the best treatment is to be obtained in great hospitals; but those of us who can afford to do so, go, often enough, to private nursing-homes or private wards. Nor do we choose, necessarily, the most distinguished, academically, among our colleagues to see us through our illnesses. We are certainly not, in this action, casting any aspersions either upon hospitals or upon learned professors. Rather we are obeying an instinct which, in others, we are apt to deprecate as irrational.

What is that instinct? The Duke of Wellington stated on one occasion that the presence of Napoleon on a battlefield was equivalent to a French reinforcement of 50,000 men. The reference was not so much to the Emperor's genius as a commander as to the effect of his personality upon his soldiers. Each man became, in his presence, a being transformed. Napoleon was well aware of it; nor was he less well aware of the importance, in war, of those influences which he knew so well how to exert—patriotism, the will to conquer, the sense of a crusade, the thirst for glory. These "*imponderabilia*," as he called them, represented in his view the most important element of victory. His proclamations to his soldiers remain as the eloquent witness of his faith. Foch held the same opinion. His dispatch, during the Battle of the Marne, remains a classic of leadership: "My centre is broken, my right recoils. All goes well. I attack."

What has this to do with the choice of a doctor? Everything. I remember still, after nearly half a century, the sense of ineffable relief and comfort which I experienced at the sight of our family doctor when any member of the family was ill. He was a very small man with an uncompromisingly bald head. But there was a look in his eyes which was worth the contents of a dozen chemists' shops.

* * *

Not that he failed to prescribe medicines. I have often observed that those men who, in any walk of life, are able to inspire confidence are almost always masters of the technique of their calling. Both Napoleon and Foch were superlatively good soldiers in the strictest professional sense; neither, had he been a doctor, would have missed a ruptured appendix or failed to make a diagnosis of diphtheria, and neither would have delayed to order the appropriate treatment. But technique, in the view of both, cannot be complete if the man himself is left out. Confidence and inspiration they insisted are the mountain peaks of technical efficiency. They would have so achieved, consequently, that their patients placed in them implicit and comfortable trust.

It seems to stand to reason that an influence which makes a man stronger and more confident than he was before he had experience of it must, similarly, exert effect upon every organ and every cell of every organ. Few dispute to-day that healing, in the last issue, is by that *vis medicatrix naturæ* upon which the doctors of earlier days placed so much reliance. The greatest doctor perhaps is he who can most magnify, in his patient's body, the healing power of nature.

All this is commonplace, of course; but there is much forgetfulness of the commonplace. The assertion that, other things being equal, the doctor with the biggest practice must necessarily be the best doctor would scarcely go unchallenged among doctors themselves. But most laymen would accept it as obvious truth. And, in fact, Napoleon—to return to him—put it forward as a rational basis for any system of remuneration of doctors by the State. He was hotly controverted by his medical advisers but refused to change his mind. Indeed he pointed to Corvisart, his personal physician, as proof of his contention, saying that Corvisart was popular because he could cure persons whom other doctors had failed to cure. Corvisart's medical memoirs are ordinary enough and do not suggest that he was possessed of any special knowledge.

Medical achievement has been so great recently in the field of physical science that the science of men has tended to be overlooked or even despised as unworthy. So much so, indeed, that, as a clinical teacher declared some years ago, "they are all engaged in studying the molecular structure of steel in order to find out what a bicycle looks like." That may perhaps be another way of saying that any divorce of medical research from the bedside is fraught with danger. For, in truth, there is no such thing as disease; there are only sick men and women.

And it is the sick men and women who must be treated.

* * *

It was suggested recently that the human organism spends all its energies in reacting to stimuli every one of which, in the absence of reaction, would be lethal to it. On that showing, and there is a substantial body of supporting evidence, the phenomena of disease are signs not, as is often asserted, of reaction but of failure to react completely. The sick man is like the man in panic: he cannot bring himself to face and overcome his trouble. That, it may be, is where the doctor really comes in. His strength and wisdom and skill are added to those of his patient so that the impossible may be accomplished. The doctor must necessarily fail where his knowledge fails, and in this truth lies the abundant justification of all research. But the fact remains that, knowledge being equal, one man succeeds where another can envisage nothing but calamity.

And this, certainly, is great mystery. I think, sometimes, that our lively fear of falling into the abyss of the magical has blinded our eyes to the reality of the mysterious. Desperately we seek to explain in terms of cells what belongs only to organs and in terms of organs that which belongs to the body as a whole. Worse still, we must force life into the measure of the dead-house lest we confess to commerce with spirit. The "endocrine complex" is all very well but it does not explain the influence of man upon man or, more mysterious still, of man upon himself through faith. Science it would seem is no more free from the temptation to play "Smart Alec" than is any other branch of human activity. It must resist that temptation and the best tonic of resistance is, without doubt, that sense of the mysterious which so conspicuously informed the minds of, for example, Pasteur and Lister. As was said by the "Rusticating Pathologist" in these columns, to hand out the present system of knowledge as if it were a system of revealed truth is a travesty of education of university standard.

* * *

The doctor, indeed, ought to go to school with the priest and the soldier, both of whom have much to teach him. Lord Baden-Powell told me years ago that his secret is the enlisting of a boy's native enthusiasm. Once that has been set to work, so to speak, a real physical culture—as opposed to "physical jerks"—becomes possible. For enthusiasm compels the lad to submit to the hard discipline of training which enthusiasm has recognised as the prerequisite of efficiency. It is the same in the arts and crafts. All these impose the fierce discipline of the raw materials, the morality of things as opposed to the morality of ideas; none lacking enthusiasm will endure so stern a schooling. The doctor's raw material is humanity, not an incoherent mass but a body of persons each sharply differentiated from all the others. The discipline imposed by them is stern so that nothing but the love of them can make it endurable. You may call this vocation or enthusiasm; of its reality and its necessity you cannot, beyond a very early age, remain in doubt. What the patient asks for above skill and knowledge is sympathy, dedication, sacrifice in the classic meaning of that word. Nor will a wise man rest until he has found it, for therein is the only true healing.

PANEL AND CONTRACT PRACTICE

The Capitation Fee

LAST year the Panel Conference asked the Insurance Acts Committee to open negotiations with the Ministry of Health for reconsideration of the capitation fee of 9*s*. awarded by a court of inquiry in 1924. A deputation waited on the Minister and pointed out that the amount of work that insurance practitioners are called upon to do has substantially increased during the past twelve years. The Minister said he thought that a flat rate *below* the present figure could well be justified; but since there was a difference of opinion he was willing to arrange for arbitration. A similar difference of opinion, it will be recalled, arose over the capitation fee to be paid for persons under sixteen years of age when these are brought under the National Health Insurance scheme, and the council of the British Medical Association report (*Brit. med. J.* April 24th, 1937, Suppl. p. 218) that they have had no further communication from the Ministry about this. They understand, however, that the arbitrators to be appointed will be asked to say what in their opinion should be the appropriate fee for medical attendance on all sections of the population.

"Negligence" and the Sequel

The London Medical Service Subcommittee has not had to meet between December and April, which we understand is a record "vacation," but they have had now to consider three cases: one in which no evidence of failure on the part of the practitioner was adduced; one in which an insurance practitioner was led to issue two certificates without examining the patient, who was actually in hospital (this was one of those cases of importunity by a financially embarrassed wife and will probably cost the unfortunate doctor £2); while the third has been the subject of considerable attention by the lay press.

On Dec. 30th, 1936, an insured person became ill and took his temperature which was 103° F. He lived in a flat in a block of such dwellings and his sister-in-law, who was looking after him while his wife was in hospital, telephoned for the practitioner at about midnight. She spoke to the caretaker of the house in which the practitioner lives and being told that the practitioner was out she again telephoned about 1 A.M. with a like result. She told the subcommittee that on each occasion she gave the name of the patient, his address, and the exact location of the flat close to a well-known hotel, indicating also that the patient seemed to be seriously ill. According to the practitioner he returned home between 1 and 2 A.M. and found a note that he was wanted at "X House," to which he proceeded, finding the house in darkness and obtaining no reply to his rings at the bell. He said he went again about 8.30 A.M. and was then told by the manageress that no request for his services had been made from that address. He telephoned home but was assured that the messages indicated that he was wanted at "X House." In point of fact the insured person resided at "Y House." The subcommittee's report says that admittedly the names of the two establishments are not dissimilar and might be confused over the telephone; but they lie some distance apart, and they had no hesitation in accepting the statement of the relative that she was at pains when telephoning

to explain the exact location of the house, and that the directions were repeated to her. The practitioner did not attend his morning surgery at all on Dec. 31st but said he was visiting patients until 6 P.M. Further telephonic applications for his services were made at 8.45 A.M. and at two or three other times during the morning, but although the caretaker asked another practitioner to visit the patient he was unable to do so. Eventually the practitioner saw the patient at about 8.15 P.M., but by then another doctor had been called and had ordered the patient's removal to hospital, where he died some eight hours later.

The practitioner told the medical service subcommittee that it was the practice of his caretaker to note the addresses from which the requests for visits came, but not the names of the patients concerned. The comment of the medical service subcommittee on these statements was as follows: "The practitioner's explanation that he was unable after two fruitless calls at 'X House' to refer to the record card for the true address because the caretaker was not in the habit of recording names, or, as it appeared from the practitioner's answers to us, even the number of the tenement, in a block of tenements, seems to us, if it is true, to point to a lack of method in carrying on his practice, which would be nothing less than appalling. His failure to offer this explanation when he did visit 'Y House' (where incidentally he enquired for the patient by name) is a strong indication that the explanation is not worthy of credence. We say this with much regret, but we should frankly still more regret the condition of things in this practice if the explanation were true." The committee decided to censure the practitioner, to require him to assume responsibility for the expense incurred in calling in another doctor, and to ask the Minister of Health to withhold the sum of £20 with a view to the deduction of a corresponding amount from the remuneration of the practitioner (who has, however, the right to appeal to the Minister). The committee have also decided to consider action under regulation 35 (2) (*a*). This regulation provides that if the committee are satisfied that owing to the number of persons included in his list a practitioner is unable to give adequate treatment to all of them, they may, after consultation with the panel committee, impose a special limit on the number of insured persons for whom the practitioner may undertake to provide treatment. In that event any number in excess of that limit shall be dealt with as though the list of the practitioner was by that number in excess of the general limit fixed for the list of practitioners in the area. The insurance committee decided to refer this case to the appropriate subcommittee to consider whether the normal maximum of 2500 insured persons should be reduced. Clearly consultation with the panel committee will take a little time and a question arises as to possible appeal. This particular practitioner has a list which is approaching the maximum and if a lower limit is fixed for him, it will of course mean that his insurance remuneration will be reduced. If, for instance, the committee decide that a limit of, say, 2200 should be applied to this practitioner, it will mean that his potential yearly insurance income will be reduced by about £135. The practitioner might feel that it was undesirable to appeal against the withholding of £20 in respect of the negligence found in the specific case but the prospect of losing part of his annual income might well lead him to appeal to the Minister. If, in fact, the committee after consultation with the panel committee, decides on a lower limit, as part of the decision in the case, the period of one month during which the practitioner may appeal will doubtless be regarded as beginning when notification of the decision for or against a lower limit is sent to him.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A NATIONAL SERUM INSTITUTE

Dr. C. J. McSweeney has been speaking to the Royal Academy of Medicine on the need for a National Serum Institute in Ireland. At present, he said, there are no manufactures of serums for diagnostic or therapeutic purposes in Ireland, and in the present state of Europe this position is not free from danger, for national emergencies elsewhere might lead to a shortage of supplies. Apart from this, serums prepared from strains of micro-organisms prevalent in other countries cannot be expected to be as potent in Ireland as serums from the native strains. The fatality-rates for such diseases as diphtheria and cerebro-spinal fever are consistently higher in Dublin than in cities in Great Britain, even when similar treatment and dosage were employed. Dr. McSweeney suggested that this difference of results may be due to a lesser efficacy of the serums made from strange strains. An institute such as he suggested would serve as a centre for investigation and research into problems relating to serum therapy and prophylaxis. If it were to be established it could most fitly be associated with the new Dublin Fever Hospital scheme, and, in such circumstances it could undertake the task of preparing an adequate supply of human immune serums for the prophylaxis and treatment of such virus diseases as measles and poliomyelitis. Convalescent donors would be numerous enough to permit the issue of serums so prepared to private practitioners. The institute, if established, should be in close association with the recently established Medical Research Council and with the medical schools of the country. It should not be given a monopoly in the manufacture of serums for the Irish Free State, nor should it have power to interfere with the business of the many reputable firms which market their biological products there. He thought it would be possible to find the necessary finances from Hospital Sweepstakes funds.

Prof. J. W. Bigger, the next speaker, emphasised the importance of such an institute from the points of view of education and research. While approving of the establishment of a serum institute, he would oppose its being under State control. State activity was seldom progressive and State control tended toward parsimony even where expenditure might be necessary. An institute would be expensive for the services it could hope to render. In the discussion which followed there was general agreement that the establishment of a serum institute deserved consideration and investigation, and it was agreed to invite the General Council of the Royal Academy of Medicine to take appropriate steps. There was a consensus of opinion that if established the institute should be free of Government control, and that one of its main objects should be the promotion of research.

CHARING CROSS HOSPITAL.—Mr. Philip Inman, speaking at the annual general meeting of the court of governors of this hospital, said that it was hoped to rebuild in or near the present site. The income for 1936 was a record one, £85,729. The expenditure was £71,143.

PUBLIC HEALTH

THE INFLUENZA EPIDEMIC IN RETROSPECT

As judged by the number of deaths attributed to influenza in the 122 Great Towns of England and Wales, the epidemic period of 1936–37 may be said to have been, roughly, from the beginning of December, 1936, to the end of March, 1937. The secular trend of the epidemic as judged by mortality in these towns (the only general numerical data we possess) is shown in the Table and diagrams below. In the

Deaths from Influenza in the Great Towns

Week ending.	Deaths.	Week ending.	Deaths.	Week ending.	Deaths.
1932		1935		1936	
Dec. 3rd	33	Dec. 7th	45	Dec. 5th	43
,, 10th	68	,, 14th	62	,, 12th	54
,, 17th	85	,, 21st	67	,, 19th	57
,, 24th	120	,, 28th	80	,, 26th	97
,, 31st	303				
1933		1936		1937	
Jan. 7th	680	Jan. 4th	110	Jan. 2nd	325
,, 14th	1039	,, 11th	110	,, 9th	768
,, 21st	1588	,, 18th	89	,, 16th	1100
,, 28th	1933	,, 25th	104	,, 23rd	1137
Feb. 4th	1909	Feb. 1st	98	,, 30th	1155
,, 11th	1306	,, 8th	85	Feb. 6th	976
,, 18th	630	,, 15th	97	,, 13th	697
,, 25th	344	,, 22nd	119	,, 20th	423
Mar. 4th	242	,, 29th	107	,, 27th	242
,, 11th	157	Mar. 7th	112	Mar. 6th	181
,, 18th	119	,, 14th	84	,, 13th	144
,, 25th	65	,, 21st	86	,, 20th	171
Total	10,621		1455		7570

seventeen weeks between the beginning of December, 1936, and the end of March, 1937, the number of deaths registered as due to influenza reached the total of 7570. This number may be compared with the 1455 in the same period of 1935–36, a normal non-epidemic year, and the 10,621 in 1932–33, the last epidemic year.

Although on a lower scale than this last wide outbreak, the recent epidemic, as judged both by mortality and by the available evidence of widespread incidence, must undoubtedly be added to the list of major visitations to which the country has been subject since the beginning of the century. In its

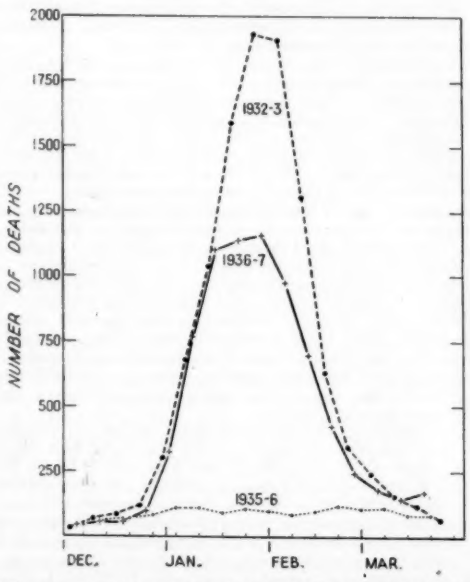


FIG. 1.—Graph showing weekly total deaths from influenza in the Great Towns in three different years.

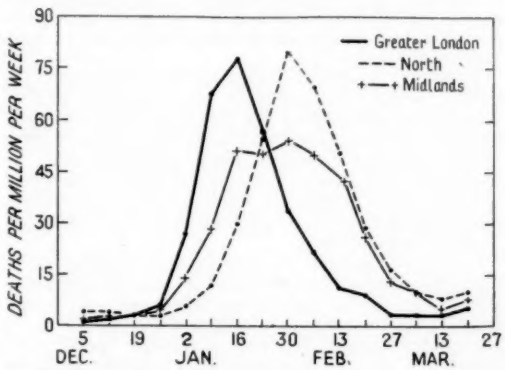


FIG. 2.—Weekly deaths from influenza in the Great Towns per million of estimated population.

time of onset and of maximum mortality it closely resembled the epidemic of 1932–33, but its rate of decline has been relatively slower. The age-distribution of mortality was of the type usually described as normal, that is, the greater share was borne by persons well on in years and relatively little by young adults. With the exception of the Welsh towns, which appear to have escaped rather lightly, there is little evidence from the mortality figures of the epidemic bearing more hardly on one part of the country than another. The death-rates from influenza between December and March vary but little between the different regional areas. There was, however, some considerable difference in the time sequence of the epidemic trend. In London, both the central area and the environs, the maximum mortality fell in the week ending Jan. 16th, and in the remaining towns of the south-east the peak came only a week later. In the northern, midland, and south-western towns it was not reached till the last week of the month, and in the eastern and Welsh towns the total continued to rise till the end of the first week of February. In general the figures show the epidemic progressing from the south to the north and radiating at the same time to the east and west.

The Health Reports of the League of Nations show that in Germany the epidemic occurred some weeks earlier, between the middle of November and the third week of December; its incidence was falling there at the same time as it rose in the southern area of England. In the U.S.A. its course appears to have been broadly parallel with that in this country. Many other European countries show evidence of epidemic prevalence and in the majority of them the peak had been reached before the end of January. There is little else to add. The work now in progress at the National Institute for Medical Research and elsewhere gives, we think, much hope of the final production of an efficient vaccine, such as might tide the population over these few weeks of sudden and universal epidemicity. Such protection might well reduce the ravages of outbreaks which we now seem destined to endure every few years.

CORRESPONDENCE

AMBULANCES AND STRETCHERS

To the Editor of THE LANCET

SIR,—In his letter on this subject in your last issue Surgeon Commander Ford advocates a standardisation which is obviously overdue. He suggests that as the majority of stretchers are of the long type it is desirable "to encourage the production of long ambulances only."

The long ambulance may be all very well for public authorities but there are large numbers of firms using ambulances for industrial accidents and the long ambulance is inconvenient and more costly. Surely it would be much better to standardise the stretchers with telescopic handles. After a few years of this standardisation the vast majority of stretchers could easily have been converted to the telescopic or short-handled type.

Surgeon Commander Ford has omitted to mention the other important factors in standardisation—namely, the wheel base, wheel diameter, and gauge of the stretcher wheels to enable them to run on a standardised track on the ambulance racks. In addition it is very necessary that hospital casualty trolleys should be similarly standardised. A very little investigation will show how standardisation of one particular is quite useless unless all the factors in stretcher construction are worked to a common specification. I urged this in a letter to your columns two years ago (*Lancet*, 1935, **1**, 574). At the moment however stretcher manufacturers and ambulance makers are continuing to act with a sweet individuality which may make it necessary to shift a seriously injured patient as many as three times between the location of the injury and his arrival in the ward. This is entirely unnecessary and quite absurd.

In advocating the retention of the long type stretcher has Surgeon Commander Ford considered that passenger lifts and railway carriages will not permit the long-handled type, whereas the telescopic-handled type of stretcher can be fitted in almost anywhere? To my mind there is no possible alternative but that the long-handled type of stretcher should be abolished.

I am, Sir, yours faithfully,

Beeston, Notts, April 23rd. L. P. LOCKHART.

ERADICATION OF BED-BUGS

To the Editor of THE LANCET

SIR,—The article by Mr. Ashmore and Mr. McKenny Hughes in your issue of Feb. 27th, on the use of coal-tar naphtha distillates in bed-bug control, draws attention once more to a serious problem. In spite of improved standards of living *Cimex lectularius* is still spreading, mainly through the introduction of infested furniture into new premises.

An agent employed against bed-bugs should if possible be (1) cheap, (2) toxic to the insect, (3) not toxic to man and animals, (4) non-inflammable, (5) easy to apply, (6) readily available, and (7) free from residual odour and not injurious to the premises disinfested. Further (8) its use should not involve much preliminary preparation. How far do coal-tar naphtha distillates fulfil these conditions?

1. *Cost.*—Their present cost is only about 2*s.* 6*d.* per gallon.

2. *Toxicity to insects.*—Since the naphtha fraction forms a toxic vapour the liquid apparently need not come into actual contact with the insects in order to kill, though in the method described it appears to be applied both as a contact insecticide and as a fumigant. Experimenting with a naphtha fraction of the same boiling range, I found that the vapour has a rapid action on bed-bugs, but that those receiving a sublethal dose rapidly recover. At the concentration specified (one gallon per 750 cubic feet) in glass containers, an exposure of six hours at 73° F. did not produce a 100 per cent. kill using third and fourth stage nymphs. After only two hours' exposure all the bugs recovered, and after four hours, 75 per cent. In each case all insects were apparently moribund after removal from the containers. The same concentration was found to be ineffective against the eggs in all stages of incubation, there being a 100 per cent. hatch after six hours' exposure under the same conditions. Although the exposure time was only six hours against 18–24 as recommended, the greater resistance of eggs than nymphs to naphtha is shown.

3. *Toxicity to man and animals.*—Although the saturated atmosphere has been proved to be relatively non-toxic to animals, gas-masks must be used during fumigation. The possible occurrence of mesitylene, which has been found to be toxic to man, must be considered. This chemical, having a boiling-point of 165° C., would, if occurring in the crude naphtha, be present in the fraction mentioned (distillation range 160°–190° C. approximately) after distillation. Local government officials and others might be led to imagine that any coal-tar naphtha fraction coming within the distillation range specified would therefore be satisfactory. Gas-works and other sources of supply, while endeavouring to keep down the cost of the product, might fail to remove mesitylene from the fraction.

4 and 5. *Inflammability and ease of application.*—The fraction specified was stated to have a flash-point of not less than 105° F. When applied by means of a sprayer, the flash-point of the fraction would be even lower in the atomised state. The fire hazard is, therefore, great, and it is doubtful, even with premises carefully sealed after fumigation, if it would be safe to have a naked light outside the room. There might also be a danger of explosion due to static electricity, when the fraction was applied by means of a pressure sprayer. Spontaneous combustion of petrol vapour has been found to be caused by static electricity, the risks being greatest under conditions of low relative humidity. Such an explosion might do much damage, and the attitude of fire insurance companies must be considered.

The volatility of naphtha decreases rapidly with decrease in temperature, but the resistance of the bugs increases with decrease in temperature. It is emphasised that fumigation should not be attempted at temperatures below 60° F., and pre-heating of the premises by means of stoves should always be adopted, except in hot weather when the room temperature is above 70° F. This is a serious drawback, especially as the temperature cannot be maintained after the room is sealed, because the stoves must be removed owing to the risk of fire. The utmost caution must be observed when applying naphtha, and the employment of well-trained men is desirable. The vapour is heavier than air, and tends to settle in the room, whereas the bugs are often located in ceiling cracks. Thus measures must be taken to ensure distribution, and concentrations far above those actually needed to kill bugs in sealed containers are necessary. In fact, the amount mentioned by Ashmore and McKenny Hughes is ten times the lethal dose, although the conditions were not stated.

6. *Availability.*—There would be no difficulty in obtaining large supplies of naphtha from gas-works and other places, but as I have said already, it is well to know the nature and percentage of toxic constituents in the fraction.

7. *Odour.*—Naphtha has a very penetrating odour. This is an objection, for it is undesirable for the sufferer to have to broadcast the fact that his premises are infested, and some vapour must escape before the rooms are sealed.

8. *Preparation of premises.*—As with HCN fumigation removal of tenants and subsequent ventilation are required.

Though naphtha is not so poisonous as cyanide and the vapour is stated to clear after a few minutes, the premises must be thoroughly aired.

With vacant houses the difficulty of finding temporary accommodation does not arise, but the attitude of tenants faced with temporary removal while their rooms and furniture are disinfested often prejudices local government officials against fumigants. Apparently with naphtha it is not thought necessary to remove all furniture, curtains, &c., since the vapour is said to penetrate at least as far as the bed-bugs secrete themselves. This is somewhat surprising, because even when HCN is used the furnishings are normally removed for van-fumigation, or steam-disinfestation in special chambers.

It will therefore be appreciated that in the practical application of an insecticide, whether against bed-bugs, cockroaches, or other insects, the toxicity to the insect is only one of many points to be considered. HCN is known to be very toxic to bed-bugs (adults, nymphs, and eggs) but it is so poisonous that it can be used only by experts. Naphtha, however, also has limitations that make it far from ideal as an insecticide.

There appears to be a place for an insecticide which the tenant, or other user, can apply himself. This introduces contact insecticides proper. The past few years have seen the development of certain contact insecticides for use against household pests fulfilling the desiderata stated at the beginning of this letter. They are mainly vegetable extracts, which, although non-toxic to man and warm-blooded animals, are very toxic to insects. Their toxicity to insects has lately been increased by the addition of certain organic materials harmless to man.

These insecticides must come into actual contact with the insect in order to kill. They are usually in the form of liquids applied by pneumatic sprayers, so as to produce a mist of finely divided droplets, which under high pressure can be forced to penetrate behind loose wall-paper and behind cracks in skirting boards. This type of disinfestation can be applied at a fraction of the cost, labour, and time of cyanide fumigation, and without danger to the occupier or operator.

When the extracts are dissolved in an odourless kerosene base of high flash-point, the fire risk is negligible. Too heavy an oil base is, however, undesirable because there is danger of staining due to its low volatility. Increased freight costs are likely to be incurred on liquids below 150° F. flash-point (see Railway Dangerous Goods Regulations) and similar regulations applying to inflammable liquids sent by road have now been introduced. High transport costs are, therefore, another point to be considered before adopting a new insecticide for use on a large scale.

There is no doubt that with fumigation enormous wastage occurs, not only in absorption but in adsorption. Bed-bugs are rarely found crawling on the walls in day-time, unless they are in very large numbers. The great majority are hidden in cracks, behind loose wall-paper, behind skirtings, and in the framework of bedsteads, and seams of mattresses and furniture. Fumigation is impartial; the fumigant cannot be concentrated on such hiding-places; thus there must be wastage. On the other hand, when using a contact insecticide in the form of a finely atomised spray from a good pneumatic hand sprayer, or preferably an electric sprayer, most of the insecticide can be directed on to the walls and into cracks, rather than into the actual room space, and a smaller volume of liquid suffices. Whatever method is adopted—fumigation or contact insecticide spraying—the room should be cleared beforehand, and the furniture dealt with separately, either by steam or cyanide fumigation. The best time to disinfest is after the room is stripped and before redecoration.

I am, Sir, yours faithfully,

J. M. HOLBORN.

Jeyes Sanitary Compounds Co. Ltd., Richmond-street, E.13.

KETOGENIC DIET AMONG ESKIMOS

To the Editor of THE LANCET

SIR,—I have recently returned from East Greenland, where I lived for fifteen months as medical officer to L. R. Wager's British East Greenland Expedition, 1935–36. We were a party of seven Europeans and fourteen Eskimos (increased by one by the end of the year). During that time I was consulted by an Eskimo woman of about 40 years of age who was suffering from frequency of micturition and scalding pain on passing her urine. I examined her urine and found that she had a *B. coli* infection. She told me that she had had several attacks in the past, but that this attack did not seem very amenable to treatment. On asking of what her treatment consisted, I learnt that she had been eating very large quantities of blubber, which is the fat of the seal. It appears that this treatment is traditional among the Eskimo colony at Angmassalik, although I do not know how frequently the condition occurs.

I should perhaps state that, contrary to normal belief, the Eskimo does not live on a very high fat diet, although he does live on a low carbohydrate diet; he is not continually eating blubber, but normally eats about as much fat with his meat as we eat with a grilled chop; that is to say, that although the total fat diet per day is higher than that to which we are accustomed the protein-fat ratio is about the same as ours.

In view of the modern treatment of cystitis by the ketogenic diet and mandelic acid this traditional treatment of the Eskimo seems to deserve notice.

I am, Sir, yours faithfully,

E. C. FOUNTAINE.

Royal Devon and Exeter Hospital, Exeter, April 22nd.

SHORT-WAVE THERAPY

To the Editor of THE LANCET

SIR,—May I draw the attention of your readers who are interested in short-wave therapy to the following quotation from a report recently issued by the American Council of Physical Therapy—a body which should certainly have its counterpart in this country.

"Much of the work of this Council in the past year has been confined to the consideration of so-called short-wave diathermy machines. In view of the deliberations, the Council believed it was justifiable to state, based on the present available evidence, the following conclusions: (1) There is no specific biologic action of high-frequency currents. (2) There is no specific bactericidal action. (3) The therapeutic effect is due to the heat produced. Elaborating these three conclusions, the Council felt that the general practitioner should understand that when he buys a short-wave diathermy machine he is purchasing an apparatus capable of producing heat. In the light of available evidence it has absolutely no other specific action."

I am, Sir, yours faithfully,

London, S.W., April 23rd. H. J. TAYLOR.

PRURITUS ANI

To the Editor of THE LANCET

SIR,—In the paper on pruritus ani which appeared in your issue of April 17th Mr. Riddoch says: "I hope to show that idiopathic pruritus ani is caused by œdema of the peri-anal skin, following on stasis in the external hæmorrhoidal veins; in other words, it is due to external piles." He mentions that X rays as a remedial agent appear to have some curative value but does not refer to radium, although the pathological condition described is one in which this agent should prove beneficial to the extent of producing a cure even in persistent cases.

The fact that X rays did not fulfil all the hopes that were entertained for them in this condition does not necessarily preclude the success of radium.

I am, Sir, yours faithfully,

RALPH H. BROWNE-CARTHEW.

London, S.W., April 19th.

INFECTION THROUGH THE OLFACTORY MUCOSA

To the Editor of THE LANCET

SIR,—The leading article in your issue of April 10th is misleading as regards the passage of pigment granules through the tissues. This follows an assumption by Rake that a mixture of iron ammonium citrate and potassium ferrocyanide solutions constitutes a suspension of Prussian blue, which it does not. Rake's papers (*J. exp. Med.* 1937, **65**, 303; *Proc. Soc. exp. Biol.* 1936, **34**, 716) contain several references to pigment, granules, or particles. For example, "prussian blue particles pass rapidly from the surface of the olfactory mucosa and within two minutes are found in the perineural spaces of the olfactory nerve-fibres and in the subarachnoid space." He misinterprets Le Gros Clark in saying that he "considered that the granules had reached the olfactory bulbs mainly by passage along the perineural spaces." Le Gros Clark tried various particulate dyes (trypan blue and Indian ink) but in no case could he demonstrate the passage of *particles* from the nose to the brain. Both he and Rake used chemical *solutions* which were precipitated by acid in the tissues only *after* absorption. Rake uses his supposed passage of particles through the olfactory mucosa to the subarachnoid spaces in support of his studies of the passage of organisms from the nose to the brain; but as he used bacteriological methods only, such need further confirmation.—I am, Sir, yours faithfully,

F. A. PICKWORTH.

Joint Board of Research for Mental Disease,
Birmingham, April 23rd.

PRISONERS AND CAPTIVES

To the Editor of THE LANCET

SIR,—Whilst fully appreciating the kindliness and human sympathy shown in the writings of your contributor Taddygaddy, I feel that in your issue of last week he allowed himself to be unnecessarily provocative. Had he paused to re-weigh his "Grains and Scruples" I am sure that he would have avoided what can only be taken as severe criticism of a considerable section of his medical colleagues. His "unfettered thoughts" have allowed him to wander into the realms of fantasy. Surely it is unnecessary and unhelpful to attempt to arouse from its grave the voluntary hospitals' claim to monopoly of human feelings which died of inanition many years ago! On behalf of those who have the responsibility of the care and treatment of the mentally deficient and the mentally ill I wish to register a strong protest against the attempt to build up prejudice against mental hospitals and institutions. I feel sure that your contributor would be persuaded to change his antiquated opinions if he would accept the invitation of any of my fellow medical superintendents or myself to come and move freely among our patients. He would run no risk of remaining "cut off and forgotten."—I am, Sir, yours faithfully,

W. GORDON MASEFIELD.

Brentwood Mental Hospital, Brentwood,
Essex, April 27th.

POSTURAL DEFORMITIES OF THE ANTEROPOSTERIOR CURVES OF THE SPINE

To the Editor of THE LANCET

SIR,—Mr. Philip Wiles, in your issue of April 17th, touches on the value of certain exercises used in ballet training.

The system on which the ballet dancer is trained is a highly technical arrangement of fundamental exercises leading to the elaborations familiar to all. They are taught always in the same order, the subject holding a fixed bar with one hand, the other being free to move. This training at "la barre" is in accord with Mr. Wiles's thesis in that, although to the spectator it appears that the exercise is being done by one leg whilst the subject stands on the other, in reality the work being done on the supporting side of the body is an apt illustration of Mr. Wiles's "absence of movement." To maintain the upright position characteristic of the ballet dancer whilst performing extremely taxing movements with one leg requires strong adjustments throughout the whole body. By the perpetual repetition of these adjustments in successive exercises, changes can be effected in posture not possible, in my opinion, by other methods in use at present. The technique is powerful, and so has its dangers. For this reason it is probably advisable that its remedial application be confined to medical gymnasts with ballet training, who are therefore able to make necessary modifications according to individual needs.

I think that Mr. Wiles is too optimistic in maintaining that it requires but little ingenuity to invent a remedial system once the principles are understood. Systems come and go. To live they must have an inherent creative quality (the ballet technique has survived some 300 years because it has this). Posture exercises must have some primitive and/or æsthetic value: a potential, if not actual, emotional quality.

I am, Sir, yours faithfully,

CELIA SPARGER, C.S.M.M.G.

London, W., April 23rd.

THE NEW WESTMINSTER HOSPITAL.—Part of the new Westminster Hospital, now being built on the St. John Gardens site in Westminster behind the Abbey, will be known as the Coronation Wing, and by gracious permission the first ward in this will be called the King George the Sixth Ward. The total cost of building the wing will be £30,000. It will contain two wards of eleven beds each, and several rooms, ancillary to the service of the wing, including a small pathological laboratory for quick examination. Nearly £20,000 has already been contributed towards the cost of this wing. Among recent contributions are two gifts of £1000 from "Aged 77." Mr. Bernard Docker, chairman of the hospital, received the second £1000 from the same generous donor this week. An alderman of Westminster and governor of the hospital has also marked his appreciation of the project with a gift of £1000.

THE SERVICES

ORGANISATION OF THE INDIAN MEDICAL SERVICE

ON April 3rd we gave an account of changes in the organisation of the Indian Medical Service. The *London Gazette* for April 20th contains a Royal Warrant amending the current rules for the "promotion and precedence" of the service. It is provided that the director-general shall hold the substantive rank of major-general, or, when approved by the Secretary of State for India, of lieutenant-general. The ranks of the other officers shall be: colonel, lieutenant-colonel, major, captain, and lieutenant. A captain with at least six years' service, a major, or a lieutenant-colonel, may be promoted to the next higher rank by brevet. Officers will be placed on the retired list when they attain the following ages: major-general, 60; colonel and brevet colonel, 57; lieutenant-colonel and major, 55; but a lieutenant-colonel who entered the Service before May 1st, 1911, and who has been specially selected for increased pay may, if he attains the age of 55 years before he completes 27 years' service for pension, be retained until completion of such service. An officer retiring on pension before completing 30 years' service will be liable, till he attains the age of 55, to be recalled to duty in case of emergency. Six of the most meritorious officers on the active list will be named honorary physicians to the King, and six honorary surgeons. On such appointment officers below the rank of colonel may be promoted to the brevet rank of colonel.

Major-General Ernest William Charles Bradfield, C.I.E., O.B.E., M.S. Lond., F.R.C.S. Edin., I.M.S., Hon. Surgeon to H.M. The King, is now Director-General, Indian Medical Service, vice Major-General C. A. Sprawson, C.I.E., K.H.P., I.M.S. retired.

Lt.-Col. J. F. James, I.M.S., retires.

The Commander-in-Chief in India has made the following appointments:—

Lt.-Col. J. J. D. Roche, R.A.M.C., as Assistant Director of Hygiene and Pathology, Western Command Headquarters.

Major J. H. G. Hunter, R.A.M.C., as officiating Surgeon to the Commander-in-Chief.

Major T. W. Davidson, R.A.M.C., as Specialist in Radiology, Peshawar District.

ROYAL NAVAL MEDICAL SERVICE

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt.-Comdr. H. M. Willoughby to *Southampton*.

Surg. Lt. M. P. Reddington to *Pembroke* for R.N. Hosp., Chatham.

Surg. Lt. (D) R. S. Daly promoted to Surg. Lt.-Comdr. (D).

Mr. A. K. Kerr of St. Ives, Cornwall, has been appointed Admiralty Surgeon and Agent for St. Ives.

ARMY MEDICAL SERVICES

Col. C. M. Drew, D.S.O., late R.A.M.C., having attained the age for retirement, is placed on retd. pay.

Lt.-Col. and Bt.-Col. J. A. Manifold, D.S.O., from R.A.M.C., to be Col.

ROYAL ARMY MEDICAL CORPS

Maj. R. R. G. Atkins, M.C., to be Lt.-Col.

Lts. to be Capts.: R. J. G. Morrison, J. W. Orr, N. C. Lendon, C. E. Watson, J. A. G. Carmichael, W. G. Bateson, A. T. Marrable, H. R. Simon, A. C. Byles, J. A. Hamilton, J. Shields, C. W. Maisey, W. T. M. Moar, K. H. Harper, T. M. W. D'Arcy, M. F. Kelleher, E. J. Crowe, and C. McGrath.

Lts. (on prob.) R. J. Niven and S. H. Gibbs are restored to the estabt.

ARMY DENTAL CORPS

Short Service Commission: F. K. Johnson to be Lt. (on prob.).

ROYAL AIR FORCE

Flight Lt. H. J. Melville is transferred to the Reserve, Class D.

Flying Offr. H. C. de B. Milne is promoted to the rank of Flight Lt.

DEATHS IN THE SERVICES

The death occurred on April 24th, in London, of Major-General Sir THOMAS YARR, C.B., K.C.M.G. He joined the Army as surgeon in January, 1886, became major, R.A.M.C., in January, 1898, lieut.-colonel in 1906, colonel in March, 1915, and major-general in 1917. He was temporary surgeon-general (without pay and allowances of the rank) while a D.M.S. in August, 1916. He served in the European War from 1914 as an A.D.M.S. and D.D.M.S. of the Mediterranean Expeditionary Force. He was mentioned in dispatches and created C.B. (Mil.) in 1915, and K.C.M.G. in 1917. He was Inspector-General of Medical Services at the War Office from 1919 to 1921. (See p. 1080 for the Obituary Notice.)

THE LANCET 100 YEARS AGO

From a leading article, May 6th, 1837, p. 232.

In the two great endowed establishments of Southwark it is even determined, by a written rule, that no person is eligible to be a surgeon to the hospital unless he have served an apprenticeship with one of the surgical officers of the establishment. This is what is called an attempt to make the profession *respectable*, that is to say, by making it *expensive*, and by restricting the selections of genius and talent which are to be displayed in the "upper ranks of the profession," from the "more respectable" and "wealthier" persons in the "upper classes of society." In pursuance of the same system, we find that the hospita surgeons are permitted by the governors to charge each student twenty or thirty guineas for the mere privilege of walking through the wards of the hospital. Then, again, the use of the patients having broken, dislocated, and ulcerated limbs, is actually sold, for a time, to a student who is yearning for the title of "dresser," for the sum of fifty or sixty pounds. . . . we know not how the provincial practitioners can be justly censured for the course which they have thought it their duty to pursue in obtaining their parochial offices, while not a word of blame is to be thrown out against the monopolising and hungry traffickers in disease and suffering in the great endowed hospitals of the nation.

But the attempt has now been fully made to secure the "respectability," as well as the pecuniary interests, of the profession, by rendering medical education *expensive*, and never was there a more signal or self-evident failure displayed than has been exhibited in the effort which has been expended to carry into operation this fraudulent, narrow-minded, irrational scheme.

* * *

From a news paragraph, p. 234.

The cerebral development of JAMES GREENACRE, who was executed on Tuesday last, for the murder of HANNAH BROWN, was strictly confirmatory of the doctrine of phrenology.

* * *

From a letter on The Ergot of Rye. Speed of its Operation, p. 239.

. . . I am of opinion, that contractions may, and I think do, take place in less than 15 minutes after the use of the secale (cornutum). On referring to my case-book, I find notes of two cases wherein contractions came on in 12 minutes after the administration of the ergot; and I also find a case published in THE LANCET of Sept. 20th, 1827–8, by Mr. J. C. Jerrard, where the pains increased in 10 minutes after the exhibition of the ergot; but much depends on the quality of the ergot, and the mode of preparing the decoction; if it be ground in a coffee-mill, with a little lump-sugar, and boiled in a *tin* saucepan, I have found it more certain in its effects, than when commonly produced in a mortar, and boiled in an *iron* pan. I am, Sir, your obedient servant,

CHRISTOPHER BRADLEY, M.R.C.S.L., &c.

Church, near Blackburn, Lancashire, April 26th, 1837.

OBITUARY

ARCHIBALD DONALD, M.D. Edin., F.R.C.P. Lond., F.C.O.G.

EMERITUS PROFESSOR OF CLINICAL OBSTETRICS AND GYNÆCOLOGY IN MANCHESTER UNIVERSITY

WE announced last week the death of the distinguished gynæcologist, Prof. Archibald Donald, which occurred on April 18th at his house in Alderley Edge, Cheshire, in the 77th year of his age.

Archibald Donald, the son of Mr. John Donald of Edinburgh, was born in 1860 and educated at Craigmount House School and the University of Edinburgh. He graduated as M.B., Ch.B. with honours in 1883, proceeding to the M.D. degree in 1886. He served as house surgeon at the Royal Maternity Hospital, Edinburgh, and was then appointed resident obstetric surgeon at St. Mary's Hospitals, Manchester. This was in 1885, and from that time forward to the end of his long career he worked in Manchester. After three years as a senior resident of St. Mary's Hospitals he was elected to the honorary staff and was recognised at an early age as a leader in this branch of medicine. By this time he had produced a small but valuable book on natural labour. In this introduction to the science of midwifery he disclaimed any intention of teaching the procedures needed in the presence of complications, but he defined and described the abnormalities which rendered further assistance desirable. The teaching was full and sound, and the book ran through eight editions. In 1895 Donald was elected gynæcological surgeon to the Manchester Royal Infirmary, and in 1912 professor of obstetrics and gynæcology in the University.

PROF. DONALD

For those who have worked only under modern conditions it is difficult to visualise the circumstances in which a surgeon worked in 1888, the year Donald was appointed to the staff of St. Mary's Hospitals, Manchester. It is true that the work of Lister was gradually permeating surgical work, but the methods were still, and for many years continued to be, those of antisepsis and included the carbolic spray and other methods, cumbersome, inefficient, and trying to operator and patient. There were no steam sterilisers for instruments, gown, and dressings; no gloves; no masks or caps; no electric light; no radiators; no Trendelenburg position; no reliable sutures. In these crude surroundings had worked the great pioneers of gynæcological surgery—Clay, Spencer Wells, Lawson Tait—and under these same disabilities began the work of Donald and his contemporaries who were to develop this branch of our profession into what we now know it.

Donald began his work with one great advantage over most of his contemporaries. St. Mary's Hospitals provided one of the largest maternity centres in the country and being in the centre of a large industrial population in which rickets abounded it ministered to an enormous number of abnormal cases. Donald was the senior resident in this hospital for three years and was responsible each year for about 4000 births as well as acting as house surgeon to 40 gynæcological beds. It was a wonderful preparation for his life's work and gave him a practical clinical knowledge which few men of his age possessed.

Abdominal surgery was in its infancy and the number of patients who could be submitted to a major operation was necessarily restricted. This fact turned Donald's mind to the problem of prolapsus uteri, a disabling condition which abounded in a district employing so much female labour. Up to this time attempts had been made to improve the lot of these poor patients by the use of supports, by anterior colporrhaphy, by amputation of the cervix, or by repairing the perineum so that a pessary could be retained, but no one had devised any operation which could be considered a cure for this distressing state. Donald decided that the only likely way was a combination of these various procedures, and in spite of universal discouragement he made the attempt five times in 1888, in each case successfully. In his first two cases silver wire was the suture material; in both of these the wounds healed well and the women were able subsequently to return to their work as charwomen without any recurrence of their trouble. For this purpose silver wire had obvious disadvantages and Donald cast around for something more suitable. About this time he heard that some German surgeons were using catgut and he decided to try it as, being absorbable, it would be ideal for this type of operation if only it would hold sufficiently long to allow healing to take place. He used it in the remaining three cases in 1888 and was delighted with the result, especially as he could bury it and so build up the floor of the pelvis in layers, upon the technique of which a good colporrhaphy depends. The principle which he then evolved, of combining an anterior and posterior colporrhaphy with amputation of the cervix, making a strong pelvic floor and perineum by building up this tissue in layers with buried catgut, is still the method employed in one of the most successful operations in surgery—and from 1888 it has been continuously employed in his old hospital. The catgut first used by Donald in 1888 was imported from Germany—each hank in a small bottle of carbolic oil. This method of preparation was not wholly satisfactory and Donald experimented with many others and finally settled upon the one in which the catgut is soaked in alcohol and iodine. For a time he did try other suture materials but as his confidence in the preparation and strength of catgut increased he discarded these and during this century rarely used anything else. He must have been one of the first surgeons—if not the first—in this country to use it and he was certainly the first to rely entirely upon it. In the whole of his long career, at first using catgut ill-prepared, he had only one case of tetanus.

In the realm of abdominal surgery Donald played a leading part, not so much in devising new operations as by perfecting and making workable the suggestions of others, his practical mind at once seizing upon the

essential and discarding the redundant. He was a brilliant operator, with a long thin hand which could reach places inaccessible to more brawny colleagues. His hands were, however, always guided by his brain: he thought out beforehand what should be done and did it with delicacy, precision, and speed, and with complete confidence in himself. His inquiring and logical mind refused to accept views merely because they were ancient or had met with general acceptance. For long retroflexion of the uterus had been regarded as one of the common causes of female ills and if a uterus was found in this position it must be rectified and held in position by a pessary or operation. Donald could not accept this and pointed out on every possible occasion that the same symptoms occurred with anteflexed as with retroflexed uteri and that many women with retroflexed uteri were symptomless. For long his was a voice crying in the wilderness, and now that a more rational view is accepted his long fight may, but should not, be forgotten. He was a strong advocate of the curette; this he did not use indiscriminately but only for specially selected cases and when he curetted he scraped the uterus quite clean. When a hysterectomy was necessary he believed in the "clean sweep" and removed both ovaries with the uterus. The conservation of an ovary on sentimental grounds made no appeal to him.

One of his outstanding features was his clinical memory which stood him in good stead in making a diagnosis in a difficult case. Generally he could recall a somewhat similar case and his skill in diagnosis was sometimes uncanny. Although best known as a gynæcologist, he was keenly interested in obstetrics and attended maternity cases up to the time of his retirement as he was a firm believer in the indivisibility of these two subjects. His earliest papers were on obstetrical subjects, and just before his death he was writing about puerperal sepsis. He served upon the departmental committee of the Ministry of Health which reported upon the cause and prevention of puerperal sepsis, and he held the view very strongly that efficient cleansing of the attendants' hands would prevent most of these cases. At an early age he became the acknowledged leader in obstetrics and gynæcology in Manchester and the surrounding district and as time progressed his circle ever widened, and he developed an enormous practice, but even in his busiest years he found time to read occasional papers before the obstetrical section of the Royal Society of Medicine, and he rarely missed a meeting of the North of England Obstetrical and Gynæcological Society where his ripe experience, clinical memory, and humour made him one of the most popular speakers.

But first and foremost Donald was a clinician. A difficult diagnosis or a troublesome operation saw him at his best and ever the patient came first. The advances he made were in the clinical field and his writings were invariably on clinical subjects. Not that he despised the scientific side—far from it; he knew more pathology than he was usually credited with and was always interested in this branch and ready to apply any scientific fact. What irritated him was the pseudo-scientific mind and the paper full of unproved theories based upon uncertain facts. Thus as a teacher Donald shone on the clinical side. For some years he was the professor of obstetrics and gynæcology at the Manchester University, but systematic lectures full of theories and lists of names never appealed to him and he finally persuaded the University to bring his subject into line with medicine and surgery and to create a new chair of clinical obstetrics and gynæcology. Here he was perfectly happy and at home, teaching by the bedside, recalling interesting cases from the vast storehouse of his memory, noticing signs unrecognised by others, and finally proving at operation that his diagnosis was correct.

Prof. Fletcher Shaw, to whom we are indebted for much of the above, gives the following personal picture:

"Like all men of mark Donald had a strong character and he always had himself in perfect control. No matter how difficult or irritating the position, he never betrayed what he felt by word or action; always perfectly courteous he carried on outwardly quite cool, and only those with intimate knowledge of him knew by the set of his jaw what he really felt. Slight in build and looking frail, it was a wonder how he got through the vast amount of work which he did, but he had a stronger constitution than he showed and he had the faculty of working without fuss or excitement. Upright, fearless, and honest, and entirely unself-seeking, he expressed his views openly though always with courtesy and with care not to hurt his opponent's feelings. He scorned the man who worked subterraneously or crookedly or pulled strings for his own glorification. What honours came his way—and they were many—gave him joy because they came unsought and generally from his own profession. He was generous and genial, radiating kindliness and with a fund of quiet humour; he loved his fellowmen and delighted to be with them as they with him. And as a colleague he was perfect. Kindly, courteous, without jealousy, and ever ready to help, he retained the friendship and respect of those he outstripped, while in his juniors he inspired pride and devotion."

A surgical colleague at the Manchester Royal Infirmary also writes: "To those who recall the extraordinary activities, physical and mental alike, of Archie Donald throughout a long and extremely distinguished professional career, it must have caused considerable distress to witness the rapid decline of the last few months during which he was confined indoors, quite unable to enjoy his beautiful garden which he loved so well and on which he had expended so much thought, interest, and energy. Of the details of such a career others, his colleagues in his special sphere of work, are in a better position to testify than the writer, but it is of Donald the man himself that one would pen a few words in most affectionate memory. Widely recognised from his early days as the outstanding exponent of his chosen specialty, Donald was throughout completely free from any taint of professional jealousy, and his help was always most willingly and cheerfully given to his younger colleagues; indeed, most of the honorary staffs of the M.R.I. and the St. Mary's Hospitals owe their position largely to his support, since his influence with the governing bodies was greater than that of any other individual medical man, and to have Donald on one's side practically connoted success in such elections. His modesty so far as concerned his own most valuable and original work was carried almost to the point of absurdity. Endowed with an almost uncanny power of sifting the wheat from the chaff among the many suggestions in the medical journals of his day, he was ever quick to seize upon and to put into practice those he considered to make for real progress. A powerful and fearless advocate of what he believed to be right, he was absolutely intolerant of shams and frills of every description, and although his advice when

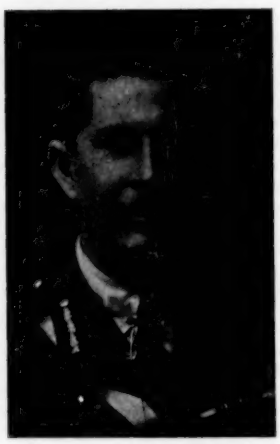
sought did not always coincide with the seeker's own inclinations yet in the long run it invariably proved correct. No one could be more loyal or generous as a friend. At the outbreak of the war Donald, then aged fifty-four, joined the à la suite staff of the 2nd General Western Hospital with the rank of captain, becoming thereby junior to most of those considerably junior to himself in civil practice; for some months, in addition to his other military duties, he took his turn to 'live in' and do what was, in reality, merely the work of a house surgeon—an admirable instance of his loyalty and devotion to what he thought to be his duty."

Prof. Donald was at different times president of the obstetrical and gynæcological section of the Royal Society of Medicine, of the North of England Obstetrical and Gynæcological Society, of the Manchester Medical Society, and the Manchester Pathological Society. He was a LL.D. of the University of Edinburgh, and D.L. for the county of Lancashire. He married Maude, daughter of Mr. R. B. Wilkinson, who survives him with two daughters and two sons. The home life was a very happy one, but they had cruel blows in the loss of two sons. The elder, an Oxford undergraduate, was killed early in the war at Gallipoli, and the third son, a barrister, died after a long illness. He is survived by a widow, two sons and two daughters, one of the sons being in medical practice in Manchester as a consulting physician.

SIR THOMAS YARR, K.C.M.G., C.B., F.R.C.S.I.

WE regret to record the death of Major-General Sir (Michael) Thomas Yarr, a distinguished officer in the R.A.M.C., and particularly well known for his excellent work in ophthalmology in connexion with military service. This occurred on April 24th in a London nursing-home.

Thomas Yarr was the son of Thomas Yarr, J.P., of Rathgar, and was born at Cloughjordan, Tipperary. He was educated at the French College, Blackrock, and Mesnières. He went for his medical training to the school of the Royal College of Surgeons in Ireland, took the diplomas of L.R.C.P.I. and L.M. in 1882, and almost immediately joined the R.A.M.C. He distinguished himself at Netley, gaining the Herbert prize, the Parkes medal, and the Martin and Montefiore memorial medals. He took the F.R.C.S.I. diploma and was at first attached to the 1st Battalion of Coldstream Guards. From 1895 for the following four years he was seconded to serve under the Foreign Office as physician to the Crown Prince of Siam. At the expiration of this office he was appointed to the staff of the Governor of Bombay, a post which he held for five years—i.e., until 1906, when he was promoted lieutenant-colonel. Both in Siam and in Bombay Yarr made his mark by his quiet efficiency and broad grasp of affairs, and while in Bombay his interest in ophthalmology developed, resulting in special work in connexion with diseases of the eye peculiar to the East. He now used his leave in attending continental clinics in Berlin, Paris, and Vienna, and held also the post of chief clinical assistant at the Royal London Ophthalmic Hospital.



SIR THOMAS YARR
[Photograph by Russell

Major Yarr saw service in the South African War and was present at operations in the Orange Free State, Transvaal, and Cape Colony, receiving the Queen's medal with four clasps. His experiences there were drawn upon in his text-book, A Manual of Military Ophthalmology, which appeared in 1902. The book was directed particularly to the needs of medical officers of the Home, Indian, and Colonial Services, and in its plan it followed familiar lines, but because of their common occurrence in soldiers, particular stress was laid on the gonorrhœal, syphilitic, and malarial infections in relation to diseases of the eye. Also he laid stress on the regulation in the Army Orders, which had just been issued, giving permission to both officers and men to wear spectacles. The regulation was due to the fact that in the South African War the bad sight of many combatants was held to have constituted a real drawback to certain operations. Particular attention was also paid by Yarr to injuries to the eye from gunshot wounds and the entrance of foreign bodies into the eye, a subject which he further dealt with in a paper communicated to the proceedings of the annual meeting of the British Medical Association in the same year.

At the outbreak of the European War Yarr served as A.D.M.S. and D.D.M.S. of the Mediterranean Expeditionary Force. He was present at the landing at Gallipoli, and later did distinguished service in Egypt and at Malta, where the hospital organisation was put to a heavy strain by the large number of cases brought to Valetta from every arm of the fighting services. Yarr was promoted temporary surgeon-general in 1916, was mentioned in dispatches, received the C.B., and, in 1917, was promoted major-general and appointed a K.C.M.G. He was given also the Legion of Honour and became a Knight of Grace of the Order of St. John. At the conclusion of hostilities he was selected to be Inspector-General of Medical Services, a post which he held until 1921.

Major-General Yarr was 75 years of age at the time of his death. He was unmarried.

THOMAS GUY MACAULAY HINE, O.B.E., M.D. Camb.

Dr. Macaulay Hine, who died on April 25th, aged 66, was the son of the late Mr. George Hine, F.R.I.B.A., consulting architect to the Royal Commission in Lunacy, who built some twenty of our largest asylums including Claybury. Dr. Hine was educated at Charterhouse and King's College, Cambridge, and went for his medical training to St. Bartholomew's Hospital. He graduated as M.B. Camb. in 1904 and became house physician to Sir Norman Moore.

Hine possessed a special flair for engineering, and in his youth he spent a year in Germany making a practical study of it. At Cambridge, however, he decided to study medicine, and after he had qualified and finished his house appointment settled down to study the fermentative characters of organisms of the diphtheria group. He wrote his M.D. thesis on the results of this investigation, which showed for the first time that certain carbohydrates, especially saccharose and dextrine, can have a useful application for the purpose of identifying the Klebs-Löffler

bacillus. When during the first winter of the war cerebro-spinal fever broke out among recruits then in training, and a large epidemic was threatened, special measures became necessary for checking its spread. The procedure adopted was under the direction of Sir William Horrocks assisted by the late Dr. R. J. Reece and by Dr. Mervyn Gordon. A central laboratory was set up at Millbank with a travelling laboratory attached to it. Dr. Gordon gave practically the whole of his time to the research, and as various points came to light they were applied by Dr. Hine, who acted as O.C., Central C.S.F. Laboratory. Thus when a special medium was arrived at for detecting the meningococcus in the nasopharynx, Dr. Hine manufactured and distributed it on a large scale to military laboratories, some fifty in number all over the country. Later on he undertook in the same way the preparation and distribution of monotypical agglutinating sera and suspensions wherewith to check them and managed to do a piece of research work as well on the optimum procedure for the purpose of preparing this serum. Later he undertook in the same way the distribution of special monotypical therapeutic serum and assessed its potency in a careful report. The special reports Nos. 3 and 50 on cerebro-spinal fever of the Medical Research Council series contains several valuable contributions by him.

Towards the end of the war when some form of mass disinfection became desirable for diminishing the abundance of the meningococcus in the naso-pharynx of carriers, experiments at the Central Laboratory made on actual carriers showed that the comparatively delicate meningococcus can be temporarily got rid of by causing carriers to inhale steam-laden air charged with droplets of zinc sulphate (1 : 50). Hine's previous training as an engineer now enabled him to devise a special jet for the purpose of keeping the air of an inhaling room charged with zinc sulphate droplets of the required strength, and later the Navy adopted this device, employing air compression instead of steam for the purpose of spraying. For his services during the war Hine received the O.B.E. and was given the honorary rank of Major. After the war he assisted the administrative staff of the Medical Research Council for a time, but for several years past he lived in retirement in Devonshire.

In 1918 he married Miss Margaret Lillywhite, who survives him with two children, a son, aged 16 and a daughter. Dr. Hine's sister, Mrs. Coxon, is the well-known novelist, Muriel Hine. Dr. Hine had been a past master of the Worshipful Company of Fruiterers, was an enthusiastic fisherman, and very popular in lay as well as medical circles where his genial presence will be much missed.

PARLIAMENTARY INTELLIGENCE

THE FACTORIES BILL IN COMMITTEE

THE Factories Bill was further considered by a Standing Committee of the House of Commons on April 20th. Major LLOYD GEORGE was in the chair.

The discussion was resumed on Clause 68, which provides among other things that, subject to certain exceptions, the total number of hours worked by women and young persons in factories, exclusive of intervals for meals and rest, shall not exceed 9 in any day, nor exceed 48 in any week; that the period of employment shall not exceed 11 hours in any day, and shall not begin earlier than six o'clock in the morning nor end later than eight o'clock in the evening, or, on Saturday, one o'clock in the afternoon; provided that where women or young persons are not employed on more than five days in the week the total hours worked may extend to 10 and the period of employment may extend to 12 hours, in any one day.

Mr. A. SHORT moved an amendment to limit the hours of work of women in factories to 40 per week. At the suggestion of the chairman the Committee agreed to discuss at the same time two other amendments on the Order Paper proposing that the hours of work of young persons in factories should be limited to 7 per day and 40 per week. Mr. Short said that up to now the Committee in the consideration of this clause had, acting on the advice of the Home Secretary, taken a most reactionary course. None of the amendments put forward by the Labour Party which were calculated to improve the position of employees which would come under this clause had been accepted. He would like to know whether the Home Secretary and the Home Office were in the pocket of the employers as to the provisions of this Bill. Women were more prone to accidents than men, and now that workshops were being included under this Bill he had no doubt that there would be an increased number of accidents. They must make this Bill worthy of the occasion. Forty-eight hours' work per week was too long for women. On the question of hours the employers of this country had been most reactionary and retrograde, and it was for Parliament, by legislation, to force them to introduce a 40-hour week.

Mr. GRAHAM WHITE said it was absolutely necessary for the well-being of the country that young people should be fit, both mentally and physically. The hours of work permitted under the Bill did not allow that degree of fitness to which the individual was entitled and which the nation required.

Mr. MCCORQUODALE said he was particularly interested in young persons, but he thought that having decided to reject the 40-hour week for men they must necessarily reject it for adult women. He thought that this country would be well advised to hold its hand in regard to the question of the 40-hour week until it had seen what would happen in France. According to his information at the present time the net result of the 40-hour week being put into practice in France had been to increase prices by nearly 30 per cent., which meant that the working men and women in France were 30 per cent. worse off than they were before as they got the same money wages. But the question of young persons—especially those under 16—was entirely different, and he strongly urged the Government to meet them in that matter. He did not believe that young persons—especially those under 16—could work 48 hours a week and maintain the best of health.

Mr. ELLIS SMITH said that he was concerned about the young people who went into industry fresh from school, particularly those between the ages of 14 and 16. More and more in modern industry they found that young persons were being put on repetition work. Work was being speeded up in this way until the increase in production in Great Britain since 1929 was greater than in any other capitalist country in the world. In big factories employing repetition methods a new process was being carried out known as "micromotion," introduced from America. Persons were specially trained to watch people at work in the factories. Films were taken of the people at work and afterwards discussed by managers and assistants in order to decide what unnecessary use of human energy there had been and what unnecessary operations could be cut out. That was a good thing. It was important in these times to increase production and obtain the maximum output in the least number of hours possible; but instead of being looked upon as a blessing methods of increased production were

regarded as a menace by the workpeople because they were not getting the benefits from this increased production which they ought to do.

Mr. DENMAN said that he did not think they could confine the working hours to seven a day. He thought that the Committee ought to agree to limit the hours of young persons to 40 per week. Since the passing of the Education Act the Government had launched a great programme of physical development and a 40-hour week was the maximum which was consistent with the declared policy of the Government in those respects. The refusal of a 40-hour week for young persons would cause severe disappointment and cause a drift away from the support of the National Government.—Viscountess ASTOR said that Mr. Denman had made it almost impossible for the Government to reject the proposal for a 40-hour week for children.

Wing Commander WRIGHT said that as an employer with a factory, in which a good deal of repetition work was done, he was in entire agreement with almost everything that Mr. Ellis Smith had said. There was no question that they could get the same sort of production in very much shorter hours and if they saw that their workpeople got a just reward for the extra effort they must make. He believed that a 40-hour week was in sight. In his own factory the workpeople always worked only 45 hours a week and they found that the workers were better, healthier, and happier, that they earned the same money, and that production had not decreased. He would like to see the hours of work of young children up to 16 reduced so far as to make it uneconomical to employ them for production in a factory while making the hours sufficient for them to be employed for instruction.

Sir J. SIMON, Home Secretary, said that there were at present about 3,000,000 men employed as workpeople in manufacturing industries; about 1,500,000 women over 18; and something like 1,000,000 young persons under 18, and of that number over 500,000 were under 16. The supply of juvenile labour in this country would fall off in a very few years, and it was much better to deal with the matter deliberately now before trouble had been stored up. But it would be a very great mistake to regard the proposals of this Bill as though they did not represent a very great improvement in this respect. As far as the present law was concerned, from the point of view of permitted hours, juveniles between 14 and 16 and between 16 and 18 and women of any age were all treated, and were, on a level. The hours at present permitted for women and young persons classed together were 55½ in textile factories and 60 hours in other factories. He was glad to think that in most cases these very long hours were never touched. But at present there was an agreed working week—say, of 48 hours—and on top of that there was a very large quantity of overtime which might extend over the whole year. In that respect women and young persons up to now had not been treated separately.

The first thing to notice about the present Bill was that it contained a gradation as regards hours. The question to decide was whether the gradation was steep enough. Under the Bill as at present drawn up adult men, as before, were left to collective bargaining, and so on. There was a statutory limit of 48 hours a week for women with permissive overtime, which was limited both in number of hours and in number of weeks. As regards young persons between 16 and 18 there was a 48-hours week, but a more limited provision concerning overtime, and as regards young persons between 14 and 16 there could not be any overtime. The gradation was an entirely new and important principle. There came the question as to whether they could do better than was done in the Bill as regards juveniles between 14 and 16. He had for some time taken the view that they could. He would like to see the permitted hours of juveniles between 14 and 16 reduced. On inquiry the medical advisers to the Home Office had advised him that the existing 48 hours could not be said, on present information, to be injurious to health, but, naturally, they would be very glad to see more time for leisure and recreation. He would put the case rather on the ground that whether they considered educational policy or physical recreation, or the future conditions under which young citizens were going to grow up, it was high time that they had a more limited number of working hours than 48 a week.

Mr. GIBBINS: Do the Minister's medical advisers, in suggesting that it is not injurious to work 48 hours a week between 14 and 16 years of age, have regard to any consequences later for young persons who work those hours?—Sir E. GRAHAM-LITTLE: Is the right hon. gentleman aware of the unanimous opinion expressed in the medical press on this subject?

Sir J. SIMON said he had stated the opinion of his skilled advisers, but on general grounds he took it that it would be better if they could get the hours reduced. But first of all more information must be obtained as to what the hours ought to be, and therefore he suggested that the alteration should be made when the Bill reached the Report stage. He did not believe that it would be possible to introduce such a provision as early as other provisions in the Bill. There must be sufficient time for the important industries to consider the question of reorganisation, but they could possibly bring the improvement into force within two years. They must leave to a particular industry the opportunity of proving, if it could, that in each case a figure different from the statutory figure—it might not be as much as 48; it might be something between the two—was justified. His view was that before that could be done three things would have to be proved: first, that the hours in that branch of industry could not reasonably be regarded as injurious to the health of young people; secondly, it would be right to stipulate that the industry must prove that the hours were not only consistent with the health of the children, but that the organisation and proper carrying out of that industry made it desirable that the young people should work these longer hours side by side with their elders; and thirdly, the industry would have to prove that the juveniles would be engaged in work of such a character as would familiarise them with and help them to train for processes in which the older people were employed and would be likely to lead up to their employment in those processes. He was not saying that these exceptions would be taken advantage of; he did not know to what extent they might be necessary, but it seemed that they constituted a fair proposal to make to industry.

Mr. SALT: Would the suggestion regarding health cut out all repetition work?—Viscountess ASTOR: And would the exception with regard to children learning a trade be dependent on proof that they were really learning it?

Sir J. SIMON said that that was his idea. He had not the least doubt that as a result of his statement the Home Office would receive a great deal of information before the Report stage of the Bill. He would be happy indeed if that information proved to be in support of an improvement of this sort.

Mr. VIANT said that the Labour Opposition were grievously disappointed with the Home Secretary's statement.—Mr. MCCORQUODALE said he thought that the Home Secretary had met the Committee in a very frank and fair manner. The Committee adjourned.

The consideration of the Bill was resumed on April 22nd. The discussion on Clause 68 was continued.

Sir J. SIMON, referring to his statement at the previous sitting, said that the modifications which he had sketched out and which he had suggested should come into force after an interval of two years would have to be expressed in a clause which provided that after that interval the figure 48 would be altered to a smaller figure with the other provisions that he indicated. That could properly be done in a

new clause which would be Clause 69. Clause 68 would be a provision as to what would happen when the Bill passed, and the new Clause 69 would be a provision as to how that would be altered after an interval. After further reflection he had come to the conclusion that the proposed change could better be made in Committee than on the Report stage, and he would undertake that that should be the procedure followed.

Mr. WAKEFIELD urged that the Home Secretary should reconsider the position of the hours of work of young persons between the ages of 16 and 18 with a view to applying similar conditions to those which he had foreshadowed for young people between 14 and 16. It would be impossible to carry out the provisions of the Bill for physical training and recreation unless young persons worked shorter hours. The health of our young people was the greatest asset we possessed and it was important, especially as the birth-rate was now declining, that we should make every effort to preserve it.

Viscountess ASTOR said it was just as important that hours should be reduced for children from 16 to 18 as for those between 14 and 16. This was a wonderful opportunity and if the Government did not take it, it would make their grant for physical fitness absurd.—Mr. BROAD said he questioned the medical advice given to the Home Secretary to the effect that factory work had no effect on the health of children. Such work stunted them in mind and body. He hoped that they would be able to restrict the hours of employment of young people until the age of 21.

Sir E. GRAHAM-LITTLE said that there were certain medical and educational arguments which had not been brought out quite explicitly and which made a very special class of the children from 14 to 16 years of age. It was for that class that he wanted very particularly to plead. Medical opinion was unanimous in wishing to restrict the hours of labour of children from 14 to 16 years of age. There was no division of opinion on that matter in any informal circle. He hoped that the Home Secretary would go beyond his official advisers in that respect. In the period from 14 to 16 years of age the whole structure of the child, physical and psychological, changed. A very great deal of work had been done—he was glad to say chiefly in this country—in investigating the psychology of that period. It was a very important consideration. The mental and physical stability of the child in those years was in a state of turmoil. The child from 14 to 16 years of age ought not to be in a factory at all. It was a most distressing thing that he should ever have been allowed to be there. Our descendants would think as harshly of us for having permitted it as we thought harshly of those persons who allowed children of tender years to work in a factory for 20 hours a day. The medical point of view was important, but they pleaded also for the educational point of view. The spirit of enthusiasm, training, discipline, and forward-looking was what the children lost if they went into a factory. They did not want the children to lose it. Children who go on from 14 to 16 should be allowed to complete that part of their education, adding to the structure of theory and science and fitting themselves to become really skilled workers in trades and occupations. The work which they did in factories from 14 to 16 was in no way a preparation for a trade. They lost all the incentive which they learned at school and they had a great period of indolence as regarded mental activity because of the absence of any incentive. At 18 they were lifeless persons and were thrown again on to the labour market. That process was utterly uneconomic and foolish. They would be contributing to the making of a C3 nation if they did not make a great effort, the opportunity for which now presented itself, for physical reconstitution.

After further discussion the Committee divided on a Labour amendment limiting the working week for women and young persons to 40 hours. This was negatived by 24 votes to 15.

Mr. LLOYD, Under-Secretary, Home Office, moved an amendment substituting 7 o'clock for 6 o'clock as the hour for beginning work in factories. He said that the Government were prepared to agree that work should not begin before 7 o'clock, except in special cases where authorised by the Secretary of State. Under a new clause which would be moved later the Secretary of State would be empowered to allow the period of employment to begin earlier than 7 o'clock, but not earlier than 6 o'clock in the case of a particular class of factory where the exigencies of the trade or the convenience of the persons employed so required.

The amendment was agreed to.

Mr. SILKIN moved an amendment providing that the period of employment should end not later than 6 o'clock instead of 8 o'clock.

Mr. LLOYD said that in certain circumstances it was for the convenience of the workers that they should start late. It would be impracticable as a matter of administration to fix an earlier period and then to give a large number of exemptions.

After further discussion Mr. Lloyd said that he had been impressed with the arguments put forward and he asked the Committee to allow the Home Office to reconsider this matter from the point of view of young persons. The amendment was withdrawn.

Subsection (*c*) of Clause 68 provides that a woman or young person shall not be employed continuously for a spell of more than 4½ hours without an interval of at least half an hour for a meal or rest, so, however, that where an interval of not less than 10 minutes is allowed in the course of a spell, the spell may be increased to 5 hours.

Mr. WHITE moved to leave out the words "or young person" from the subsection. He said that it was not the intention of the amendment merely to take young people out of the protection of the clause. The amendment had to be read in conjunction with another providing for the limitation of spells of work of young people to 3½ hours.

Mr. LLOYD said that the provisions in the Bill had been put in as a result of the experience of the Factory Department of the Home Office in order to provide the intervals and rest pauses that were necessary, but also to avoid making unnecessary long rest pauses which were inconvenient and much resented by the workers concerned. He thought they ought to have heard some stronger reasons for the insertion of the amendment. These proposals had been incorporated in the Bill as a result of work subsidised by the Medical Research Council. Mr. WHITE said that 3½ hours' work at a time was a sufficiently long period for any young person who came straight from school. The amendment was negatived.

Sir E. GRAHAM-LITTLE moved to leave out the words "four and a half" and to insert the word "three" in the subsection. He said that it was well established that spells of work of more than three hours, especially in the case of young people, caused attention to flag and the incidence of accidents was very largely due to, and increased by, inattention. Practical proof of that was to hand in statistics.

Mr. LLOYD said that the hon. Member had put forward medical opinion that the proposal in the Bill was too long and that three hours was the maximum that ought to prevail. That was not the conclusion to which the Industrial Health Research Board came when they made a special investigation into these subjects. Their general conclusion after an examination of sickness records and so on was that it was impossible to obtain reliable evidence as to the change in the duration of work spells affecting sickness rates. Therefore in this matter medical opinion was divided.

Sir E. GRAHAM-LITTLE: Does "sickness rates" include accidents?—Mr. LLOYD: No, but from the accidents point of view the reports of the factory inspectors tend to show that it is not at the end of the period of work, even in regard to young persons,

that accidents mostly occur. They tend much more to occur somewhere about the beginning of work or during periods of maximum production when there is a tendency to work too fast.

The amendment was negatived.

The further consideration of the Bill was adjourned.

GOVERNMENT AND MILK POLICY

NEW BILL PROMISED

In the House of Lords on April 27th, on the motion of Lord MARKS, the Poole Corporation Bill was read a second time.

Lord CRANWORTH moved an instruction to the Committee which will consider the Bill to delete Clause 21, which relates to by-laws "as to pasteurisation, &c., of milk." He said that the Poole Corporation admitted that this clause was included in the Bill because of the recent outbreak of typhoid at Bournemouth. This was panic legislation.

Viscount HALIFAX, Lord Privy Seal, said that the health of the people must be the first and last consideration, and the question of vested interests did not arise. The Bill was not opposed on petitions, but he understood it was the intention of the Chairman of Committees to refer the Bill to a Select Committee of the House in order that the proposals as to pasteurisation might be examined. In the view of the Government such an inquiry would be unsatisfactory and probably inconclusive. An inquiry of that kind ought not to be held in connexion with any particular locality; the question could only be considered as a general one affecting the country as a whole. The Government had reviewed the whole matter, and he was authorised to announce that it was their intention to bring forward long-term legislation dealing with milk policy generally in the near future. In this connexion the Government would examine the question of pasteurisation in the light of all the evidence that was available with a view to deciding whether or not it would be in the public interest, with due regard to the interests of the milk industry, to include provisions with regard to it in the legislative proposals. He supported Lord Cranworth's motion.

Viscount DAWSON OF PENN said that the Poole experiment would have been a very valuable one, but they were obliged to be influenced by the question of cost. If it was to be such a costly matter he could see the force of the argument for waiting for a general measure. But no indication had been given how long it would be before that general measure came into operation. There was an overwhelming body of evidence in every civilised country that pasteurisation was an efficient means of preventing the continuance of certain infectious diseases. The mortality from tuberculosis had declined, but there had not been so much improvement in regard to the bovine type of infection as in regard to the human form of infection.

Lord Cranworth's motion was carried.

NOTES ON CURRENT TOPICS

In the House of Lords on April 22nd the Hydrogen Cyanide (Fumigation) Bill passed through Committee.

The Lords amendments to the Education (Deaf Children) Bill were agreed to in the House of Commons on April 21st. On April 22nd, in the House of Commons, the Special Areas (Amendment) Bill passed through Committee.

In the House of Lords on April 27th the Special Areas Bill, which was read the third time in the House of Commons on April 26th, was read a first time.

In the House of Lords on April 27th Lord STRATHCONA AND MOUNT ROYAL moved the second reading of the Maternity Services (Scotland) Bill.

The Bill was read a second time.

The Edinburgh Royal Maternity and Simpson Memorial Hospital Order Confirmation Bill was read the third time in the House of Commons on April 26th.

Consideration of the Widows', Orphans', and Old Age Contributory Pensions (Voluntary Contributors) Bill was concluded by the Standing Committee of the House of Commons on April 27th. Sir KINGSLEY WOOD, Minister of Health, announced that on the third reading in the House of Commons he would make a statement with regard to the date of the coming into operation of the scheme. The Bill was ordered to be reported, with amendments, to the House of Commons.

QUESTION TIME

WEDNESDAY, APRIL 21ST

Medical Reports on Gaol Conditions in Kenya

Mr. DAY asked the Secretary of State for the Colonies whether he would give particulars of any recent reports on gaol conditions that he had received from the local medical authorities in Nairobi, Kenya, and the number of deaths from tuberculosis that had been recorded at the Nairobi prison for each of the last three years; and what steps it was proposed to take to further improve existing conditions.—Mr. ORMSBY-GORE replied: I have received no reports from the medical authorities in Kenya relating specifically to gaol conditions in the Colony. The annual reports of the Prisons Department for the years 1933, 1934, and 1935 indicate that the total deaths in the Nairobi prison during those years were 12, 31, and 22 respectively, of which more than half were due to pneumonia. No deaths were due to tuberculosis. A separate ward for the hospital treatment of patients with this disease was constructed in 1933.

Mr. DAY: Does the report show that the conditions in this gaol are considerably worse than they are in other Colonial prisons?—Mr. ORMSBY-GORE: No, Sir.

Hillingdon Hospital and Omnibus Services

Mr. DAY asked the Minister of Transport whether he was aware that there was no omnibus service from the terminus at Hillingdon Church to the Hillingdon County Hospital, Middlesex, which necessitated out-patients attending this hospital daily walking long distances, and caused many of them to rest by the wayside or collapse on arrival at the hospital; and if he would make representations to the omnibus authorities serving this district, asking them to continue the omnibus service to this hospital during certain hours.—Mr. HORE-BELISHA replied: The Board have informed the councils concerned that they are prepared to make application for a route between Uxbridge and West Drayton passing the hospital as soon as the roads are suitable for omnibus operation.

THURSDAY, APRIL 22ND

Irish Casual Labour and Insurance Payments

Captain MCEWEN asked the Minister of Labour whether he was aware that in the case of casual labour from the Irish Free State contributions to the national health and unemployment insurance funds were demanded from employers; and, seeing that in most cases the labourer did not remain in this country for as long as the statutory six months which would enable him to qualify for benefit, would he take steps to alter this position.—Mr. ERNEST BROWN replied: Under the general scheme of unemployment insurance joint contributions are payable in respect of all persons employed in insurable employment in Great Britain. Under the agricultural scheme persons not domiciled in and ordinarily resident outside the United Kingdom are excluded from unemployment insurance. Their employers are, however, required to pay employers' contributions in order to avoid a special inducement to employ such persons. In the case of health and pensions insurance, there is an arrangement whereby contributions paid in respect of employment in Great Britain count for benefit in the Irish Free State.

Coroners and Post-mortem Examinations

Mr. WILSON asked the Home Secretary whether he could state for the last available year and for other than county boroughs the number of post-mortem examinations directed or requested by coroners; and in how many of these cases the examination took place in hospitals, in

mortuary premises, and in other places, respectively.—Sir JOHN SIMON replied: Excluding the City of London, the County of London, and county boroughs forming complete coroners' districts, the figure for 1936 was 10,274. I have no information which would enable me to answer the second part of the question.

Mr. WILSON: Is the right hon. gentleman aware that on a recent occasion there was no fit place for a post-mortem examination and that it was held on the village green.—Sir J. SIMON: I do not know that.

Magistrates and the Birching of Boys

Mr. SHORT asked the Home Secretary if he was aware that nine boys were ordered to be birched by justices in the West Riding juvenile court, Doncaster, on April 7th; whether the sentences had been carried out; and whether, seeing that a committee was being appointed to consider the question of birching, he proposed to advise magistrates and others not to order birching between now and the committee reporting.—Sir JOHN SIMON replied: Yes, Sir, nine boys were ordered on April 7th to receive three strokes of the birch. Eight were birched on that day; a medical officer certified that the ninth was unfit for the punishment. As it must be widely known that I have decided to appoint a committee to consider the question, I do not think that further action on my part is required.

Mr. SHORT: Will the right hon. gentleman go a little further than that and advise magistrates not to order such sentences having regard to the fact that a committee of inquiry is being appointed?—Sir J. SIMON: I do not think I can do that. The duty of the committee will be to ascertain and to advise, and I am hurrying up the appointment of the committee in every possible way. In the meantime I am sure that benches of magistrates will realise that I regard this subject as one which needs investigation.

Deaths in Armley Gaol, Leeds

Mr. LUNN asked the Home Secretary whether he would make a statement concerning the death of one man two days after admission to Armley Gaol, Leeds, as a debtor, and another, 19 years of age, who had committed suicide in the gaol during this month; and if he would institute an inquiry into the circumstances.—Sir JOHN SIMON replied: I have already made careful inquiry into both these cases. The first prisoner was a man of 43 who was received into Leeds prison on April 2nd. He was examined on admission by the medical officer and found to be suffering from valvular disease of the heart. In view of this it was arranged that he should be given no work requiring physical exertion. On the night of April 3rd he died—apparently in his sleep. The law requires that there shall be an inquest on every death in prison, and the jury found that death was due to natural causes. There is no suggestion that anything in his treatment in prison contributed to his death, and there is nothing the prison staff could have done to prevent or to render less likely this sudden heart failure. The second case was that of a young man serving a sentence of three months in the second division. He was examined on his admission on April 2nd, and there was nothing wrong with him physically or mentally. His conduct while in prison was good; he gave no trouble and there was no question of any disciplinary treatment. On April 12th he was at work in the morning in association with other prisoners and there was nothing abnormal in his behaviour. At about 12.45 he was in his cell and was seen by the medical officer in the course of a routine round of the cells. He was then quite cheerful. At 1.15 the librarian officer who distributes books to prisoners visited his cell and the prisoner was then sitting reading. At 1.40 he was found dead, having hanged himself from the window bars of his cell. In this case also there was an inquest. There was nothing the prison staff could have done to prevent this tragic occurrence and there is no suggestion that there was anything in the nature of harsh treatment which might have contributed to this impulsive suicide.

Mr. LUNN: Is the right hon. gentleman aware that there is some uneasiness in Leeds about these two tragic events and will the Home Office not call for some further inquiry into this matter, as well as other matters in connexion with our prisons, so as to remove the possibility of such happenings as these?—Sir J. SIMON: I am not at all surprised that people in Leeds or elsewhere should feel anxious about these incidents, and they are deeply distressing, I need not say that to the Home Office, but I have given information quite impartially and I hope very much that with the hon. Member's help that will allay public anxiety about these two cases.

Provision of School Canteens

Viscountess ASTOR asked the President of the Board of Education whether, in view of the growing realisation of the importance of nutrition, and particularly of the fact that children who underwent physical exercises should be properly fed, he would take measures to ensure that no new school, whether for juniors or seniors, was built without provision being made for a canteen.—Mr. OLIVER STANLEY replied: I have already drawn the attention of local authorities to the desirability of providing school canteens at schools where children come from a distance, and in the consideration of plans for new senior schools this point is always borne in mind. I am also prepared to consider any proposals by local authorities to make arrangements for school dinners in schools where children do not come from a distance, but I am not prepared to require the provision of canteens in all new senior and junior schools.

Anthropometric Surveys of School-children

Mr. EDE asked the President of the Board of Education if he would publish the results of the anthropometric survey made by his officers of the children attending the Alderman Wraith Secondary School, Spennymoor, County Durham, the Surbiton County School for Boys, Surrey, and the Woking County School for Girls, Surrey.—Mr. OLIVER STANLEY replied: I do not think that the subject is one of sufficient general interest to justify separate publication of the particulars, but I am having a copy placed in the Library of the House for hon. Members who may be interested. Moreover, I understand that the Board's chief medical officer proposes to refer to the matter in his next annual report.

Mortuaries

Mr. WILSON asked the Minister of Health how many local authorities, other than those of county boroughs, had provided mortuaries as empowered by Section 143 of the Public Health Act of 1875; and how many had not made any such provision.—Sir KINGSLEY WOOD replied: I have no complete information on this subject, but since April 1st, 1920, loans have been sanctioned by my department for the provision of mortuaries by 63 local authorities other than county boroughs.

Maternal Mortality Reports

Mrs. TATE asked the Minister of Health when the report on the special investigations into maternal mortality made by his officers in various parts of the country would be available.—Sir KINGSLEY WOOD replied: I hope to lay this report before the House in the course of the next few days.

Infantile Mortality

Mr. THORNE: Has the Minister any reasons why there is such a very low infantile mortality in Letchworth?—Sir K. WOOD: Letchworth is a very small unit, the total births being about 200 or less each year. During the past few years the infantile mortality-rate has been 17·62 per 1000 live births.

Mr. THORNE asked the Minister of Health the rate of infant mortality in the city of Letchworth; and if he can say what is the average infantile mortality for England Wales, and Scotland.—Sir KINGSLEY WOOD replied: For 1935, the last year for which separate figures are as yet available, the mortality-rates of infants under one year of age per thousand live births were: Letchworth U.D., 17; England, 56; Wales (including Monmouth), 63. With regard to Scotland, the hon. Member should address an inquiry to my right hon. friend, the Secretary of State.

Hospital Facilities in Newfoundland

Mr. BROOKE asked the Secretary of State for Dominion Affairs whether any steps were being taken to remedy the lack of hospital facilities in Newfoundland which was shown in the report of the Department of Health and Welfare; and whether any measures are contemplated to combat the high rate of infant mortality and the prevalence of tuberculosis.—Lord HARTINGTON, Parliamentary Secretary for Dominion Office, replied: The measures now in progress for the improvement of the hospital facilities in Newfoundland, including the enlargement of certain hospitals at St. John's and the completion of a chain of Cottage Hospitals outside the capital, were summarised in chapter iv of the annual report of the Commission of Government for 1936, Cmd. 5425. My right hon. friend has recently received from the Governor detailed proposals for the extension of the Tuberculosis Sanatorium, and a special survey of tuberculosis conditions is in progress. Consideration is also being given to the establishment in outpost districts of prenatal clinics and child welfare services corresponding to those in operation at St. John's. I may add that special attention will be given to the improvement of medical and health facilities in the formulation of the long-term programme of economic reconstruction which is now under consideration.

Mr. PETHERICK: Is it not the case that a considerable number of additional medical officers have been appointed?—No further answer was given.

MONDAY, APRIL 26TH

Medical Practitioners and Health Insurance

Mr. RHYS DAVIES asked the Minister of Health whether he was now able to state the terms of reference and the personnel of the tribunal to inquire into the fees paid to panel doctors under the national health insurance scheme.—Mr. HUDSON, Parliamentary Secretary to the Ministry of Health, replied: No, Sir. The arrangements for the inquiry are not quite complete, but I will inform the hon. Member as soon as they are settled.

TUESDAY, APRIL 27TH

The Army and Blood Transfusions

Mr. WAKEFIELD asked the Secretary of State for War what supplies, if any, were available of human blood suitable for transfusion, grouped and bacteriologically tested, for large-scale emergency treatment.—Mr. DUFF COOPER replied: The Army policy is not to store blood for large-scale transfusion, as the period for which this can be done is very limited. Each military formation has a number of donors grouped and tested who are available for this service.

Mr. WAKEFIELD asked if the right hon. gentleman was aware that in Russia large stores of human blood were available and had been used very successfully in cases of emergency.—Mr. DUFF COOPER said that there were reports to that effect, but it was more satisfactory to store our blood in our people.—Mr. MUFF: May I ask if it is blue blood?

The Causes of Silicosis

Mr. TOM SMITH asked the Secretary for Mines if he had any information concerning discussions relative to silicosis and its causes mentioned recently by the President of the Institute of Mining and Metallurgy.—Captain CROOKSHANK replied: I have not yet seen a full report of the President's speech last Thursday, but I understand that it referred particularly to the progress of research into methods of collecting samples of dust from the air breathed by mineworkers, and of examining and analysing such samples. My Department is closely in touch with this work through its technical officers.

Family Incomes and the Means Test

Mr. OLIVER asked the Minister of Labour whether his attention had been drawn to the hardships caused by the inclusion, for the purpose of calculating family incomes in respect of the means test, of lump sums paid to injured workmen by way of compensation under the Workmen's Compensation Act; and whether, in view of the fact that these commutated sums represented the loss of earning capacity, both present and future, of injured workmen, and were not savings or interest on investments, he would consider discontinuing assessing these settlements for the purposes of relief of unemployment existing in the households of these workmen.—Lieut.-Colonel MUIRHEAD replied: I would remind the hon. Member that the special nature of these lump sum payments has already been recognised by the Board so that one-half is treated as required for the special needs or personal requirements of the holder. If the holder is other than the applicant or the applicant's husband, wife, father, or mother, the balance is taken into account only in so far as the actual income derived from it, together with any other available resources, exceeds the amount of the scale rates of the holder and his dependants. In other cases the balance of one-half is regarded as producing an income of 1*s.* per week for each £25 in excess of the first £25.

Day and Night Nursery at Bristol

Mrs. TATE asked the Minister of Health (1) whether the Bristol Council proposed that one member of the staff of the Bristol day and night nursery in Ashley-road, Bristol, should be a trained nurse; (2) what steps the Bristol Council were taking to ensure that fuller medical records should be kept at the Bristol day and night nursery; and (3) whether arrangements had now been made by the Bristol Council for systematic medical inspection of children in the Bristol day and night nursery.—Sir J. BLUNDELL, Lord of the Treasury, replied: My right hon. friend is in communication with the Bristol City Council regarding the three matters referred to and will inform my hon. friend of the result.

School-children and Tuberculosis

Mr. GROVES asked the Minister of Health how many cases of tuberculosis had been notified among school-children during the last year for which the figures were available, in Chesterfield and in Sheffield, respectively.—Sir KINGSLEY WOOD replied: 394 fresh cases of tuberculosis were notified among children between the ages of 5 and 15 in Sheffield in 1936, and 7 were notified among children between the same ages in Chesterfield in 1935, the last year for which figures are at present available for that borough.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 17TH, 1937

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1678; diphtheria, 1019; enteric fever, 25; pneumonia (primary or influenzal), 1159; puerperal fever, 33; puerperal pyrexia, 137; cerebro-spinal fever, 24; acute poliomyelitis, 8; acute polio-encephalitis, 0; encephalitis lethargica, 6; dysentery, 18; ophthalmia neonatorum, 106. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 23rd was 3196 which included: Scarlet fever, 853; diphtheria, 904; measles, 39; whooping-cough, 512; puerperal fever, 18 mothers (plus 14 babies); encephalitis lethargica, 284; poliomyelitis, 1. At St. Margaret's Hospital there were 19 babies (plus 5 mothers) with ophthalmia neonatorum.

Deaths.—In 123 great towns, including London, there was no death from small-pox or from enteric fever, 13 (0) from measles, 3 (0) from scarlet fever, 24 (5) from whooping-cough, 26 (3) from diphtheria, 53 (14) from diarrhœa and enteritis under two years, and 73 (10) from influenza. The figures in parentheses are those for London itself.

Greater London had one death from enteric fever. Eight deaths from measles were reported from Birmingham and 4 deaths from whooping-cough from Manchester. There were also 3 deaths from diphtheria at Birmingham.

The number of stillbirths notified during the week was 299 (corresponding to a rate of 42 per 1000 total births), including 46 in London.

MEDICAL NEWS

University of Oxford

The electors to the Nuffield professorship of obstetrics and gynæcology at Oxford announce the appointment of John Chassar Moir to the post, duties to start on Oct. 1st.

Dr. Moir is 37 years of age and was educated at Montrose Academy and Edinburgh University. He graduated in 1922, and in 1930 gained the M.D. degree, his thesis on an obstetrical subject being awarded a gold medal. He is a fellow of the Royal College of Surgeons of Edinburgh and a fellow of the British College of Obstetricians and Gynæcologists. After some years' experience of general practice and of general surgery Dr. Moir devoted himself to gynæcology and obstetrics. He studied in Vienna and Berlin and later (having been awarded a Rockefeller travelling fellowship) in Johns Hopkins Hospital and other American clinics. In 1930, he became full-time assistant to the obstetrical unit at University College Hospital, London, and, in 1935, was appointed reader in obstetrics and gynæcology in the University of London, holding office at the new British Postgraduate Medical School. Dr. Moir is known for his clinical research, especially for his studies of the muscular activity of the human pregnant and non-pregnant uterus. This work led to the discovery of a new active principle in ergot, and in a later combined investigation with the late H. W. Dudley, F.R.S., the substance responsible for the traditional clinical activity of this drug was isolated and identified as a new alkaloid, now known as ergometrine.

University of Cambridge

On Monday, May 10th, at 5 P.M., Prof. A. V. Hill, F.R.S., will deliver the Linacre lecture. His subject will be the heat-production of muscle and nerve.

University of Glasgow

On April 24th the following degrees were conferred :—

M.D.—Annie R. Chalmers, D. K. M. Chalmers, *Edgar Cochrane, J. A. M. Hall, D. W. Hendry, and William Telfer (with commendation); S. M. Laird, *J. S. McNair.

* In absentia.

M.B., Ch.B.—R. B. Wright (with honours); I. C. Wilson (with commendation); M. O. Alakija, I. A. M. Beaton, William Begg, S. A. Bond, J. M. Brown, Robert Browning, Bernard Camber, Annie Cameron, D. A. Cannon, Harold Carnovsky, John Cassells, W. J. Christie, Isabel S. Craig, William Cross, J. M. Cuthbert, A. L. Dick, Alexander Donald, Muriel F. Frew, C. R. George, W. E. Gifford, A. M. Gilchrist, D. R. Gorrie, J. D. P. Graham, R. F. Hand, Calman Hecht, Violet M. M. Howat, Mary M. C. V. Howie, J. B. Hurll, Alexander Jack, M. I. Krischer, O. P. D. Lawson, J. C. Liddle, B. D. Ling, John Loudon, J. M. McBride, A. H. McDougall, J. C. MacIntosh, W. W. W. McNeish, A. M. Maiden, W. W. Millen, W. N. Miller, D. N. B. Morrison, Kenneth Murray, W. G. Oman, J. R. Preston, P. A. Rodger, D. C. Russell, Joseph Shapiro, Reynard Smith, A. N. Stirling, Isidor Stoll, Irma M. A. Thomson, J. D. Uytman, J. Y. Walker, Alexandra C. Watson, and D. C. Wiseman.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the Faculty held on April 5th, with Prof. Archibald Young, the president, in the chair, the following were admitted to the fellowship :—

Andrew Girdwood Fergusson and Thomas Landles Gordon (Glasgow), Donald Valsler Marshall (Hull), and Arthur Maclennan Sutherland (Glasgow).

British College of Obstetricians and Gynæcologists

A meeting of the council of the College was held on April 24th, with Sir Ewen Maclean, the president, in the chair. The following were formally admitted to the fellowship :—

O'Donel Thornley Dodwell Browne (Dublin), James Robertson Campbell Canney (Cambridge), Robert Henry Joseph Mulhall Corbet (Dublin), *Thomas Frederick Corkill (Wellington, New Zealand), *Herculano Diogo De Sa (Bombay), Charlotte Anne Douglas (Edinburgh), Henry Harvey Evers (Newcastle-upon-Tyne), Arthur Oliver Gray (London), Sidney Blashill Herd (Liverpool), *Charlotte Leighton Houlton (Delhi), Andrew Carey McAllister and William McKim Herbert McCullagh (London), *George Henry Mahony (Patna), Percy Malpas (Liverpool), *Mangaldas Mehta (Bombay), Douglas Miller (Edinburgh), *Cyril MacDonald Plumptre (Madras), Frederick Roques (London), Harold Harley Seymour (Hove), Harry Leslie Shepherd (Bristol), John Eric Stacey (Sheffield), and *Brian Herbert Swift (Adelaide).

The following were admitted to the membership :—

G. S. Adam, *R. F. W. K. Allen, Doris C. Bates, *F. A. Bellingham, Margaret G. Bott, *Edith M. Brown, H. H. Caple, William Clement, D. I. Finlayson, W. F. Flint, U. P. Gupta, William Hunter, C. W. A. Kimbell, W. A. Liston, Barbara M. Macewen, Margaret M. McDowall, K. A. McGarrity, Gerald Maizels, *Gladys H. Marchant, C. F. Marks, H. S. Morton, B. C. Murless, Louis Rich, C. E. B. Rickards, G. W. Robson, J. M. Sanson, J. W. Schabort, C. P. Scott, *Lydia I. H. Torrance, and William Waddell.

* In absentia.

At the annual general meeting which followed Dr. J. P. Hedley, Prof. E. F. Murray, Prof. Gilbert Strachan, Prof. William Gough, and Dr. D. G. Madill were elected to the council as representatives of the fellows, and Dr. J. W. G. H. Riddell, Mr. John Sturrock, and Dr. A. W. Spain as representatives of the members.

King's College Hospital

The Listerian Society of this hospital will meet there on Wednesday, May 5th, at 8.15 P.M., when Prof. Charles Singer will speak on medicine in early England.

London School of Hygiene and Tropical Medicine

One Fishmongers' Company studentship is awarded annually at the school. It carries remission of fees for the D.P.H. course. Applications to compete for the studentship must be sent to the secretary of the school, Keppel-street, W.C.1, by June 14th. The examination will be held on June 22nd and 23rd.

Glasgow University Club, London

This club will dine at the Trocadero Restaurant, London, W., on Friday, 28th May, at 7.30 P.M., when the principal of the University, Sir Hector Hetherington, will be in the chair. The Earl of Derby will be the guest of the chairman. The hon. secretaries may be addressed at 62, Harley-house, London, N.W.1.

College of Physicians and Surgeons of Bombay

At a meeting held in January the council of the college decided to institute an examination for a diploma in ophthalmic medicine and surgery and appointed a committee to draw up regulations and a syllabus. On March 12th the report of this committee was adopted, and the first examination for the diploma will be held in July. Copies of the regulations may be had from the secretary of the college.

The Factories Bill

The council of the Save the Children Fund, while welcoming the Factories Bill now before Parliament, has passed a resolution urging its amendment so as to ensure that no child shall be employed in a factory before the age of 15; that no child or young person shall be permitted to work more than 40 hours a week; that no overtime be permitted for workers under 18 years of age; that holidays with pay be assured to all children and young persons; that the hour of leaving work may be sufficiently early to enable children and young persons to take advantage of available opportunities for education and recreation; and that the clause providing that the Home Secretary may suspend Part II of the Bill (dealing with safety) until 1940 be eliminated.

London County Council

A meeting of the Council on April 27th received proposals for a new antitoxin establishment at a site which is available at Queen Mary's Hospital, Carshalton. The accommodation at the existing antitoxin establishment, at Belmont, Sutton, is still inadequate despite the alterations and additions which have been carried out from time to time, and twice the existing space is required. The proposed new establishment, which will cost about £116,000, will ensure a constant and ample supply for the Council's hospitals of products which are made at Belmont and also of others which are now being purchased. There will also be extra facilities for research work. The laboratories at Belmont will be retained for work which can conveniently be carried out there.

Other improvements which are to be carried out at the Council's hospitals include the construction of two new isolation blocks, each containing 60 single-bed wards, at the Southern Hospital. A new nurses' home will also be provided and the existing accommodation for the nursing staff will be altered. The total estimated cost of these extensions is about £91,300. A new sanitary annexe is to be provided at St. George-in-the-East Hospital, and the sanitary annexes at Archway Hospital are to be remodelled and extended. A new operating theatre is to be added at St. Charles' Hospital at a cost of about £9000.

Dame Janet Campbell has been appointed a member of the hospitals and medical services committee of the Council.

Schorstein Research Fellowship in Medical Science, 1937

The Board of the Faculty of Medicine at Oxford will make an election to the above Fellowship in June, 1937, if a candidate of sufficient merit presents himself. The fellowship, which will be of the value of £300, will be tenable for one year from Oct. 1st, 1937, in any medical department or institute at Oxford, under such regulations as the Board may approve. Candidates must be graduate members of the University, holding a registrable medical qualification, and must be under thirty-five years of age on Oct. 1st, 1937. Candidates must submit their applications to the dean of the medical school, University Museum, not later than Monday, May 3rd, 1937. Each candidate must submit: (1) evidence of age; (2) testimonials (three copies) or names of referees; (3) a statement of his career; (4) a statement of the department of medical science in which he proposes to research.

The British Social Hygiene Council

There is a real need for further subscriptions to the British Social Hygiene Council if its valuable work is to be continued in its present practical way. The B.B.C. will consequently afford the Council an opportunity of making a public appeal. This will be done on Sunday, May 2nd at 8.45 P.M., Prof. John Hilton making the appeal. In a second direction the Council is seeking public support by holding an Empire Ball on July 6th. The Ball will take place at Grosvenor House and an important number of patrons have already been secured. There will be a cabaret and various competitions for prizes; the tickets for the Ball are £2 2*s*. each, or £10 10*s*. for six, and it is hoped that visitors from overseas will support the entertainment. The tickets are obtainable from Grosvenor House, Park lane, The Ball Committee, Carteret House, Carteret-street, Westminster, S.W.1, and the Over-Seas League, Park-place, St. James's, S.W.1.

Incorporated Society of Chiropodists

The annual dinner was held at the Trocadero, London, on April 24th. The toast of the medical profession was proposed by Mr. Charles Doughty, K.C. Sir Frederick Menzies, F.R.C.P., in response, said that medical science was developing more and more in the direction of team work, one of the remarkable developments was the formation of groups of non-medical workers, without whom the efficient work of a hospital could not be done; radiographers, dieticians, electric therapists, masseurs, and so on. One of these days the work in which chiropodists were engaged must also become an essential unit of any hospital service. Thousands of people were going about the country suffering acutely from conditions of the feet which could be remedied by chiropodists who had an enormous sphere of work. So long as the members of the Incorporated Society of Chiropodists rigidly adhered to the high standards they had set themselves, they were bound to succeed in their aims. He looked to the greatest possible coöperation between them and the medical profession in the interests of the community. Mr. A. Simpson-Smith, F.R.C.S., proposed the toast of "this most progressive society." Chiropody, he said, was assuming greater importance year by year and had long eclipsed the mere cure of the corn. Chiropody was rapidly becoming of national importance, particularly as every week something like 135 people were killed and 5000 injured on the road largely through not being quick enough on their feet. He foresaw that in the national scheme of physical fitness, that is about to be launched, there would be proper provision for the many C3 feet which were the increasing outcome of arduous occupations in industry. One could not have an A1 nation with C3 feet. Mr. John H. Hanby, F.I.S.Ch., responded from the chair. They had, he said, recently secured the coöperation of the Royal College of Surgeons with regard to their examinations, and had every hope that the Royal College of Physicians would coöperate in a similar manner by confirming a recommendation made by a joint committee of both colleges, thus strengthening the confidence which had been placed in them both collectively and individually by various public bodies such as general hospitals and infirmaries, where so large a number of their members held appointments. Certain authorities, hospitals and other institutions throughout the country had realised the importance of chiropodial treatment, and last year 120,000 treatments were given in the five foot hospitals with which the society was associated. But all these were merely touching the fringe of this vital problem. The only way of dealing adequately with this important question was to make chiropody available as a panel benefit under the National Health Insurance, thus giving 15,000,000 people the opportunity to improve their general physical condition.

Royal Society of Medicine

This society's house and library will be closed from Wednesday, May 12th, to Tuesday, May 18th, both days inclusive.

International Congress on Occupational Diseases and Industrial Welfare

The Journées Internationales de Pathologie et d'Organisation du Travail will be held in Paris from June 1st to 6th under the presidency of V. Balthazard, professor of forensic medicine in the University of Paris. Further information may be had from the secretary-general of the congress, Dr. G. Hausser, Institute Médico-Légal, Place Mazas, Paris XII.

Travelling Fellowships in Medicine

The Medical Research Council invite applications for six Rockefeller medical fellowships for the academic year 1937–38. These are provided from a fund with which the council have been entrusted by the Rockefeller Foundation of New York. They are intended for British graduates who have had some training in research work in clinical medicine or surgery, or in some other branch of medical science, and who are likely to profit by a period of work at a centre in the United States or elsewhere abroad, before taking up positions for higher teaching or research in the United Kingdom. The stipend will ordinarily be at the rate of £400 per annum for a single fellow, and of £450 per annum for a married fellow. Travelling expenses and some other allowances will be paid in addition.

The Council also invite applications for four Dorothy Temple Cross research fellowships in tuberculosis. The object of these fellowships is to give special opportunities for study or research to suitably qualified British subjects of either sex "intending to devote themselves to the advancement by teaching or research of curative or preventive treatment of tuberculosis in all or any of its forms." The stipend will ordinarily be fixed at the rate of £400 per annum, with travelling expenses in addition.

Applications for these fellowships must be sent to the Council not later than June 1st. Further particulars may be had from the secretary of the Council, 38, Old Queen street, London, S.W.1.

Fellowship of Medicine and Post-Graduate Medical Association

The following courses will be given during May and early June: dermatology at St. John's Hospital (afternoons, May 3rd to 29th); thoracic surgery at the Brompton Hospital (all-day, May 24th to 29th); urology at St. Peter's Hospital (all-day, May 31st to June 12th); gynæcology at the Chelsea Hospital for Women (June 14th to 26th). Week-end courses will be held in chest diseases at the Brompton Hospital (May 8th and 9th); in physical medicine at the St. John Clinic and Institute of Physical Medicine (May 22nd and 23rd); in children's diseases at the Princess Elizabeth of York Hospital (May 29th and 30th); in general medicine at the Prince of Wales Hospital (June 5th and 6th); in obstetrics at the City of London Maternity Hospital (June 12th and 13th). During June, for M.R.C.P. candidates, there will be a clinical and pathological course at the National Temperance Hospital (8 P.M., Tuesdays and Thursdays, June 1st to 17th); a course in chest diseases at the Brompton Hospital (twice weekly, 5 P.M., June 7th to July 3rd); a course in heart and lung diseases at the Victoria Park Hospital (Wednesdays and Fridays, 6 P.M., June 9th to July 3rd); and an afternoon course in neurology at the West End Hospital for Nervous Diseases (June 21st to July 3rd). The annual dinner-dance of the fellowship will take place at Claridge's Hotel on Friday, May 28th; tickets can be obtained from the secretary of the fellowship at 1, Wimpole-street, London, W.1, by any member of the medical profession.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
TUESDAY, May 4th.
Orthopædics. 5.30 P.M. (Cases at 4.30 P.M.) Annual General Meeting. Mr. L. H. F. Walton: 1. Congenital Deformity of the Hip. 2. Lumbar Scoliosis; case for diagnosis.
WEDNESDAY.
Surgery. 5.30 P.M. Annual General Meeting.
THURSDAY.
History of Medicine. 5 P.M. Annual General Meeting. Prof. Bernard Ashmole: The Monster in Greek Art. (Illustrated by lantern slides.)
FRIDAY.
Otology. 10.30 A.M. (Cases at 9.30 A.M.) Annual General Meeting. Dr. Le Mée (Paris), Dr. Ritchie Rodger, Mr. Stirk Adams, Dr. J. H. Ebbs, Mr. C. E. Scott, and Mr. R. B. Lumsden: Otitis Media in Early Childhood.
Laryngology. 5 P.M. (Cases at 4.30 P.M.) Annual General Meeting. Prof. Hugh Cairns: Injuries of the Frontal and Ethmoidal Sinuses, producing Cerebro-spinal Rhinorrhœa. Mr. V. E. Negus: Short Paper and Demonstration of Anatomical Specimens. 4 P.M. Dr. Le Mée: Fulminating Laryngo-tracheo-bronchitis. (Film.) Ten Minutes in the Bronchoscopic Clinic at Philadelphia. (Colour film.)

PADDINGTON MEDICAL SOCIETY.
TUESDAY, May 4th.—9 P.M. (Town Hall, Paddington-green, W.), Dr. G. F. McCleary: The Threatened Depopulation of the British Commonwealth.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY, Stepney-green, E.
THURSDAY, May 6th.—3.15 P.M., Dr. D. T. Davies, Prof. G. Grey Turner, and Dr. H. Graham Hodgson: Modern Aspects on the Diagnosis and Treatment of Gastric Ulcer.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

UNIVERSITY OF LONDON.
MONDAY, May 3rd, TUESDAY, and THURSDAY.—5 P.M. (University College, Gower-street, W.C.), Prof. H. Rein: Some Economising Mechanisms as a Condition of the Body's Adaptation to Increased Activity.

UNIVERSITY OF BIRMINGHAM.
THURSDAY, May 6th.—4 P.M., Prof. J. C. Drummond, D.Sc.: The D Vitamins and other Members of the Fat-soluble Group. (William Withering lecture.)

EMPIRE CONFERENCE ON CARE AND AFTER-CARE OF THE TUBERCULOUS.
MONDAY, May 3rd.—10.30 A.M. (Overseas House, St. James's), Sir Kingsley Wood, Sir Arthur MacNalty: The Modern Outlook on Tuberculosis. Major-General Sir Cuthbert Sprawson: Peculiarities of the Tuberculosis Problem in India. Dr. R. E. Wodehouse (Ottawa), and Dr. B. A. Dormer (S. Africa) will also speak. 2.30 P.M., Dr. A. D. Pringle: The Care and After-care of the Tuberculous among (*a*) the European Mining Population of the Rand, (*b*) the European Non-mining Population of the Transvaal and Natal. Dr. S. Vere Pearson and Dr. F. R. G. Heaf: Tuberculosis and City Environment. Sir Pendrill Varrier-Jones: Environmental Factors in Care and After-care.
TUESDAY.—10.30 A.M., Dr. D. A. Powell: The Fight against Tuberculosis throughout the Empire: Wales. Sir Henry Gauvain: Some Problems of Surgical Tuberculosis. Dr. L. S. T. Burrell: The Function of the Hospital in the Tuberculosis Problem. Dr. A. J. Collins (Australia) and Dr. R. J. Collins (Canada) will also speak. 2.30 P.M., Dr. Ernest Watt, Ishbel Marchioness of Aberdeen and Temair, and Miss Gloria Langmaid (Canada) will speak. Dr. J. B. McDougall: The Re-Settlement of the Tuberculous ex-Soldier. Mr. Douglas M. Deane (Angorichina) and Dr. G. Lissant Cox will also speak.
WEDNESDAY.—10.30 A.M., Dr. Charles Wilcocks (Tanganyika): Tuberculosis in East Africa. Dr. P. V. Benjamin (South India) and Mr. Norman M. Maclennan (Palestine) will also speak. 2.30 P.M., Dr. Pringle: Tuberculosis in the Natives of South Africa with respect to Care and After-care. Dr. J. Cauchi (Nigeria): Tuberculosis in West Africa. Dr. G. M. C. Powell (Northern Rhodesia) and Dr. R. B. MacGregor (Straits Settlements) will also speak.

ST. MARY'S HOSPITAL, W.
TUESDAY, May 4th.—5 P.M. (Institute of Pathology), Dr. F. M. R. Walshe: Some General Principles in Neurological Diagnosis.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
MONDAY, May 3rd.—2.30 P.M., Dr. C. W. Buckley: Arthritis.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Mr. E. J. King, Ph.D.: Acid-base Metabolism. 3 P.M., clinical and pathological conference (surgical). 4 P.M., Mr. J. E. H. Roberts: Surgery of the Chest. 4.30 P.M., Dr. W. E. Gye: Experimental Cancer Research.
THURSDAY.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Mr. A. K. Henry: Demonstrations of the Cadaver of Surgical Exposures. 3.30 P.M., Mr. Aleck Bourne: Salpingitis.
FRIDAY.—2 P.M., operative obstetrics. 3 P.M., clinical and pathological conference (obstetrics and gynæcology).
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics, and operations, obstetrical and gynæcological clinics and operations. Refresher course for general practitioners.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, May 3rd.—10 A.M., Dr. Post: X Ray Film Demonstration, skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical and gynæcological wards, medical, surgical, and gynæcological clinics. 4.15 P.M., Dr. Archer: Biochemical Demonstration.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, genito-urinary, and eye clinics.
FRIDAY.—10 A.M., medical wards, skin clinic. Noon, lecture on treatment. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Dr. Archer: Biochemical Demonstration.
SATURDAY.—10 A.M., children's and surgical clinics. 11 A.M., medical wards.
The lectures at 4.15 P.M. are open to all medical practitioners without fee.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, May 3rd, to SUNDAY, May 9th.—MAUDSLEY HOSPITAL, Denmark-hill, S.E., afternoon course in psychological medicine.—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology (open to non-members).—BROMPTON HOSPITAL, S.W., Sat. and Sun., course in chest diseases.—Unless otherwise stated, courses arranged by the fellowship are open only to members.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, May 6th.—2 P.M., Dr. Wilfred Pearson: Nephritis. 3 P.M., Mr. Denis Browne: Treatment of Empyema.
Out-patient clinics daily at 10 A.M. and ward visits at 2 P.M.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
MONDAY, May 3rd.—5 P.M., Dr. M. Sydney Thomson: Animal Diseases Communicable to Man.
TUESDAY.—5 P.M., Dr. H. Corsi: Diseases of the Nails.
THURSDAY.—5 P.M., Dr. J. M. H. MacLeod: Ringworm Infections.
FRIDAY.—5 P.M., Dr. W. K. Sibley: Alopecia.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, May 4th.—4.15 P.M., Dr. A. Hillyard Holmes: Hæmatemesis.
FRIDAY.—4.15 P.M., Dr. William Brockbank: Demonstration of Medical Cases.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY, May 5th.—4.15 P.M. (Royal Hospital for Sick Children), Dr. Stanley Graham: Deficiency Diseases in Childhood.

Vacancies

For further information refer to the advertisement columns

Aberdeen Royal Infirmary.—Second Hon. Ophth. Surgeon. Also Surg. Reg., £200.
Barking Borough.—Res. M.O., £350.
Barnsley, Beckett Hosp. and Dispensary.—Cas. O., £250.
Barnsley, St. Helen Municipal General Hosp.—M.O., £650.
Bath and Wessex Children's Orthopædic Hosp., Combe Park.—H.S., at rate of £120.
Bedford County Hosp.—Second H.S., at rate of £150.
Benenden, Kent National Sanatorium.—Med. Supt., £600.
Birmingham City.—Res. Asst. M.O., £400.
Birmingham, Great Barr Park Colony.—Jun. Asst. Res. M.O., £275.
Birmingham, Queen's Hosp.—Res. Surg. O., £150.
Bolingbroke Hosp., Wandsworth Common, S.W.—Cas. O. and H.S., each at rate of £120.
Bolleys Park Colony, near Chertsey, Surrey.—Med. Supt., £1000.
Bournemouth, Royal National Sanatorium.—Res. Asst. M.O., £200.
Brighton, Royal Alexandra Hosp. for Sick Children.—H.S., £120.
Brighton, Royal Sussex County Hosp.—H.S., £150.
Bristol Royal Infirmary and Bristol General Hosp.—Two Hon. Radiologists. Also Radio-Diagnostician, £500.
Cardiff, Welsh National School of Medicine.—Jun. Asst. for Medical Unit, £250.
Central London Throat, Nose, and Ear Hosp., Gray's Inn-road, W.C.—Hon. Assts. to Out-patient's Dept. Also Third Res. H.S., at rate of £75.
Children's Hosp., Hampstead, N.W.—Res. M.O., at rate of £150.

Colchester, Essex County Hosp.—H.P., £150.
Connaught Hosp., Walthamstow, E.—Cas. O., at rate of £100.
Coventry and Warwickshire Hosp.—Res. Cas. O., £125.
Croydon County Borough.—Asst. M.O.H. and Asst. School M.O., £500. Also Deputy M.O.H. and Deputy School M.O., £720.
Dorchester, Dorset County Hosp.—H.S., at rate of £150.
Dudley, Guest Hosp.—Second H.S., £120.
East Ham Memorial Hosp., Shrewsbury-road, E.—H.S. to Spec. Depts., and Cas. O., at rate of £120.
Hampstead General and North-West London Hosp., Haverstock-hill, N.W.—Cas. M.O. and Cas. Surg. O. for Out-patient Dept., each at rate of £100.
Hosp. for Tropical Diseases, 25, Gordon-street, W.C.—Hon. Asst. Physician. Also Pathologist, £750.
Hove General Hosp.—Sen. and Jun. Res. M.O.'s, £150 and £120 respectively.
Hull Royal Infirmary.—Second Cas. O., at rate of £150.
Ilford, King George Hosp.—Hon. Chief Asst. to Orthopædic and Fracture Dept. Res. Surg. O. and Med. Reg., £250 and £150 respectively. Also two H.S.'s, each at rate of £100.
Kettering and District General Hosp.—Res. M.O. and Second Res. M.O., £160 and £140 respectively.
Larbert, Stirling District Mental Hosp.—Third Asst. M.O., £250.
Leeds General Infirmary.—Hon. Physician.
Leicester City Mental Hosp., Humberstone.—Locum Tenens Asst. M.O., 10 guineas per week.
Lincoln County Hosp.—Jun. H.S., at rate of £150.
London County Council.—Asst. M.O., £470. Asst. M.O.'s Grade II., £250. Also Temp. District M.O., £250.
London Jewish Hosp., Stepney Green, E.—Res. M.O. and H.P., at rate of £150. Also Res. H.S. and Res. Cas. O., each at rate of £100.
Maidstone, West Kent General Hosp.—H.S., £17 5.
Manchester City Education Committee.—Psychiatrist, £500.
Market Drayton, Cheshire Joint Sanatorium.—Resident Locum, 6 gns. per week.
Middlesbrough, North Riding Infirmary.—Cas. O., at rate of £150.
Middlesex Hosp., W.—Jun. M.O. for Radio-therapy Dept. and Asst. for Dept. of Physical Medicine, each £300.
Northamptonshire County Council.—Temp. Asst. County M.O.H., £500.
Northwood, Mount Vernon Hosp.—Clin. Pathologist, £500.
Norwich, Norfolk and Norwich Hosp.—Res. Surg. O., £250.
Nottingham General Hosp.—H.S. for Ear, Nose, and Throat Dept. and Res. Cas. O., each at rate of £150.
Oldham Municipal Hosp.,—Res. Asst. M.O., at rate of £200.
Oxford Eye Hosp., Walton-street.—H.S. to Ophthalmic Dept., £150.
Plymouth, Prince of Wales's Hosp.—H.S., at rate of £120.
Preston, County Mental Hosp., Whittingham.—Res. Jun. Asst. M.O., £500.
Preston, Sharoe Green Hosp.—Med. Supt., £850.
Princess Louise Kensington Hosp. for Children, St. Quintin-avenue, W.—Hon. Ophth. Surgeon. Also H.S., at rate of £120–£150.
Queens Hosp. for Children, Hackney-road, E.—H.S., at rate of £100.
Radium Institute, Riding House-street, W.—Res. M.O., at rate of £250.
Reading, Royal Berkshire Hosp.—Cas. O. and H.S. to Spec. Depts., each at rate of £150.
Royal Cancer Hosp., Fulham-road, S.W.—H.S., at rate of £100. Also H.S. to Radium Dept., at rate of £200.
Royal Free Hosp., Gray's Inn-road, W.C.—Asst. Physician.
Royal London Ophthalmic Hosp., City-road, E.C.—Out-patient Officer, £100.
Royal Naval Medical Service.—M.O.'s.
Royal Northern Hosp., Holloway, N.—H.P. and H.S., each at rate of £70.
Royal Waterloo Hosp. for Children and Women, Waterloo-road, S.E.—Res. Cas. O. for Out-patient Dept., at rate of £150.
St. Bartholomew's Hosp., E.C.—Asst. Aural Surgeon.
St. Helens County Borough.—Asst. M.O.H., £500.
St. Pancras Metropolitan Borough.—Asst. Welfare M.O., 1½ guineas per session.
Salford City.—Asst. Maternity and Child Welfare M.O., £250.
Salisbury General Infirmary.—H.P., at rate of £125. Also Res. M.O., £250.
Salvation Army, Mothers' Hosp., Lower Clapton-road, E.—Two Jun. Res. M.O.'s, each £80.
Shrewsbury, Royal Salop Infirmary.—Res. H.S., at rate of £160.
Simla, Medical Council of India.—Secretary, Rs. 1200–75–1500.
Southampton, Royal South Hants and Southampton Hosp.—Sen. H.S., £200. H.P., H.S., Res. Anæsthetist and H.S., &c., and Cas. O., each at rate of £150.
Stockton-on-Tees, Durham County Mental Hosp., Winterton.—Locum Tenens Asst. M.O., 1 guinea per day.
Stoke-on-Trent, Burslem, Haywood, and Tunstall War Memorial Hosp.—Res. H.S., at rate of £175.
Swansea General and Eye Hosp.—Cas. O., at rate of £150–£175.
Tunbridge Wells, Kent and Sussex Hosp.—H.S., £150.
University of London.—University Chair of Bacteriology, £1000.
Uxbridge, Hillingdon County Hosp.—Jun. Res. Asst. M.O., at rate of £250.
Wallasey, Victoria Central Hosp.—Jun. H.S., £150.
West Ham County Borough.—M.O.H. and School M.O., £1500.
West Suffolk County Council.—Asst. County M.O. and Asst. School M.O., £500.
Wickford, Runwell Hosp. for Nervous and Mental Disorders.—H.P., at rate of £150.
Wolverhampton, New Cross Hosp.—Res. Asst. M.O., £200.
Wolverhampton Royal Hosp.—H.S.'s, at rate of £100.
Woolwich and District War Memorial Hosp., Shooters-hill, S.E.—Three Hon. Anæsthetists.
Worthing Hosp.—H.S., at rate of £130.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Pewsey (Wilts) and Redcar (Yorks, N.R.).

Appointments

BLAIR, BRYCE, M.B. Lond., Resident Assistant Medical Officer at the Epsom County Hospital.
CHISHOLM, W. N., M.B., F.R.C.S. Edin., D.C.O.G., Resident Medical Superintendent at Park Hospital, Davyhulme, near Manchester.
GORROD, C. E., M.B. Aberd., Assistant Medical Officer at King George's Sanatorium for Sailors, Bramshott.
ODLUM, DORIS, M.R.C.S. Eng., D.P.M., Hon. Psychiatrist to the Psychiatric Department of the Elizabeth Garrett Anderson Hospital; and Hon. Senior Psychiatrist to the Department for Nervous Disorders of the Royal Victoria and West Hants Hospital, Bournemouth.
ROBINSON, G. L., M.B. Camb., Research Worker in Rheumatic Diseases at the Devonshire Royal Hospital, Buxton.
TIERNEY, J. A., M.B. Glasg., Assistant Medical Officer at the Royal Eastern Counties Institution, Colchester.

London County Council Hospital Staff.—The following appointments, promotions, and transfers are announced. A.M.O. (I.) and (II.) = Assistant Medical Officer, Grades I. or II., Temp. = temporary, Med. Sup. = Medical Superintendent.
MARTIN, F. R., M.D. Glasg., D.P.M., Temp. Visiting M.O. (part-time), Sutton Training Centre;
OSBORNE, J. W., M.B. Syd., M.R.C.P. Lond., A.M.O. (I.), St. Mary Abbots;
MAIZELS, GERALD, M.B. Manch., M.C.O.G., A.M.O. (I.), Dulwich;
LEONARD, F. R., M.B. N.Z., F.R.C.S. Eng., A.M.O. (I.), St. Alfege's;
HOTSON, CHRISTOPHER, M.B., F.R.C.S. Edin., A.M.O. (I.), Lambeth;
BRADLEY, D. J., M.B. Dubl., A.M.O. (I.), Queen Mary's, Carshalton;
KAY, ELIZABETH B., M.B. Glasg., A.M.O. (I.), Queen Mary's, Carshalton;
NEVIN, MARY E., M.B. Belf., A.M.O. (II.), White Oak;
SMELLIE, ELSPETH W., B.M. Oxon., A.M.O. (II.), Queen Mary's, Carshalton;
VICKERS, KATHLEEN M. N., L.R.C.S. Irel., L.M., A.M.O. (II.), Norwood Children's;
PALMER, E. A. E., M.B. Camb., D.A., A.M.O. (II.), St. Andrew's;
MITCHELL, EVELYN E., M.B. Edin., A.M.O. (II.), St. Giles;
ROGERS, KATHARINE C., M.R.C.S. Eng., A.M.O. (II.), St. Giles;
MAYEUR, MARY H., M.D. Lond., A.M.O. (II.), St. James';
BAKER, HARRY, M.B. Manch., A.M.O. (II.), Bethnal Green;
SMITH, T. M., M.B. N.Z., A.M.O. (II.), Bethnal Green;
DOWLING, P. G., M.B. Melb., A.M.O. (II.), Lambeth;
BELL, A. L. W., M.R.C.S. Eng., A.M.O. (II.), Queen Mary's, Sidcup;
BLAIR, E. J., M.D. Durh., A.M.O. (II.), St. Mary, Islington;
ROGERS, GEOFFREY, M.R.C.S. Eng., A.M.O. (II.), St. Peter's;
GUNN, WILLIAM, M.B. Aberd., M.R.C.P. Lond., D.P.H., Med. Sup., North-Western;
MILLOY, J. MCN., M.B. Glasg., F.R.C.S. Eng., Med. Sup., Archway;
WEST, H. O., M.D., F.R.C.P. Lond., D.P.H., Med. Sup., Queen Mary's, Carshalton;
HENDERSON, R. G., M.D. Aberd., D.P.H., Divisional Medical Officer, Central Administrative Staff;
AIKEN, J. P., M.B., N.U.I., Deputy Med. Sup. I., Dulwich;
EVANS, J. C., M.R.C.P. Lond., Deputy Med. Sup., II., Bethnal Green;
WILKIE, DAVID, M.D. Edin., F.R.C.S. Eng., Senior A.M.O. (I.), St. Pancras;
LEWYS-LLOYD, R. A. V., M.B. Lond., D.P.H., Senior A.M.O. (I.), St. Nicholas;
WILKIE, ALFRED, M.B. Aberd., Senior A.M.O. (II.), Heatherwood;
HILL, R. A., M.B. Lond., F.R.C.S. Edin., Senior A.M.O. (II.), St. Charles';
THOMAS, R. G., M.B. Lond., F.R.C.S. Edin., A.M.O. (II.), St. George-in-the-East;
DEWAR, A. F. R., M.D. Glasg., A.M.O. (II.), St. Stephen's;
ARTHUR, J. B., M.B. Edin., A.M.O. (I.), Bethnal Green;
BOYLE, A. K., M.B. Glasg., A.M.O. (I.), St. Peter's;
FRASER, T. A., M.D. Aberd., A.M.O. (I.), Mile End;
MELTON, GEORGE, M.D., M.R.C.P. Lond., A.M.O. (I.), Lewisham;
SAVAGE, O. A., M.R.C.S. Eng., A.M.O. (I.), Grove;
HOGARTH, J. C., M.B. Glasg., A.M.O. (I.), Eastern;
CLARK, D. C., M.B. Lond., A.M.O. (II.), St. Mary, Islington;
PRICE, ISAAC, M.B. Lond., F.R.C.S. Eng., Deputy Med. Sup. (II.), St. Andrew's;
MOORE, ELIZABETH M., M.B. Belf., Senior A.M.O. (II.), Mile End;
GRIFFIN, T. F. R., M.B. Lond., F.R.C.S. Eng., A.M.O. (I.), Bethnal Green;
NICHOL, R. W., B.A., M.R.C.S. Eng., A.M.O. (I.), St. Charles';
BYRNE, P. A., M.B., N.U.I., A.M.O. (II.), Lambeth; and
COVENEY, MARGARET F., M.B. Sheff., D.P.H., A.M.O. (I.), White Oak.

Certifying Surgeons under the Factory and Workshop Acts: Dr. A. K. JAMES (Calne, Wiltshire); Dr. C. J. FAIRLIE (Blyth, Northumberland); Dr. J. D. B. VAILE (Chertsey, Surrey); Dr. C. S. LEWIS (Staveley, Derbyshire); and Dr. G. W. SCOTT (Malvern, Worcester).

WORCESTER ROYAL INFIRMARY.—Lady Atkins, mayor of Worcester, was on April 19th elected chairman of this hospital.

NOTES, COMMENTS, AND ABSTRACTS

THE MATERNAL MORTALITY REPORT

FOR two years medical officers of the Ministry of Health have been making a special investigation of maternal mortality and morbidity. Their long-awaited report is published as we go to press.

The task before them was to discover why the puerperal mortality-rate has not fallen, despite increased interest taken in maternal welfare, extension of maternity services, and improvement in the general health.

FACTORS IN CAUSATION

Dealing with the regional distribution they point out that for many years puerperal mortality has been higher in Wales and the north-west of England than in the country as a whole. This regional inequality is, however, not confined to maternal mortality-rates; with certain exceptions the distribution of the general death-rates, infant mortality-rates, tuberculosis and other rates show some correspondence with the rates from puerperal causes.

Various factors possibly responsible were considered. The available evidence shows, it is reported, that districts in which there are areas with *bad housing and overcrowding* are just as likely to have low rates of puerperal mortality as those in which the housing is good and the overcrowding less. In the districts visited it was not generally found that the puerperal mortality-rates were higher in the areas with most overcrowding. Nor did these show any consistent association with corresponding variations in *economic conditions*. The influence of the nature of the *dietary* and of *nutrition* on maternal mortality cannot, it is observed, be accurately assessed in the present state of knowledge. The tendency for the mortality-rates to be higher in the north and west and lower in the south and east of the country suggested that *climatic conditions* might in part exert an influence, but the data required to demonstrate the association are not complete. Again, it was found that deaths from puerperal sepsis tended to occur most frequently in the coldest quarter of the year, that being the quarter which immediately succeeds the wettest and most sunless quarter, while deaths from toxæmia tend to occur in the warmest quarter. But the significance of this association cannot yet be assessed.

The information obtained by the investigators suggests that the practice of artificially induced *abortion* is frequent, appears to be increasing, is more prevalent in some districts than in others, and is not restricted to any one social class. Approximately 14 per cent. of all puerperal deaths are due to this cause (excluding deaths from abortion classed as criminal). The risk attending artificially induced abortion does not appear to be sufficiently realised, and there is urgent need for the education of women respecting the damage to health and the danger to life from attempts to terminate pregnancy artificially. The facilities available in some areas for the in-patient treatment of cases of abortion under expert supervision are inadequate.

THE MATERNITY SERVICE AND THE PRACTITIONER

Local investigation of maternal deaths indicates that ignorance or lack of coöperation on the part of the patient or her relatives often prejudiced her chance of recovery, and illustrated the need for more systematic and careful medical supervision during the antenatal period, more skilful management of some confinements, more frequent reference of cases of doubt or difficulty for the advice and treatment of an expert obstetrician, and earlier admission to hospital of many patients. The primary conclusions of the investigators are that (1) those general practitioners who undertake obstetric work should be interested, experienced, and actively engaged in the practice of midwifery, have sufficient time for unhurried work, and be prepared to coöperate with the appropriate members of the local public health department and with the other agents concerned with the promotion of maternal welfare in the district. (2) The services of obstetric experts should be readily accessible in every area. (3) Everything possible should be done not only to induce expectant mothers to avail themselves of the facilities provided for them, but also to impress upon them the importance of accepting and acting upon the advice proffered.

The report contains an outline of an efficient maternity service of a local authority and includes subjects recommended for consideration in order to render the services more fully effective. It is pointed out that the underlying principles of antenatal care are sound, but that optimal results cannot be expected until antenatal supervision attains a high general standard and expectant mothers make full and intelligent use of it. The development of consultative antenatal clinic sessions, under the clinical supervision of an expert obstetrician, to serve every area is of importance in order to render antenatal services more efficient.

The report refers to the decrease in domiciliary confinements conducted by general practitioners, the increase in those for which midwives are responsible, and the rapid and increasing development of institutional midwifery in many districts. The investigation showed that many medical practitioners undertake a considerable amount of obstetric work with competence and skill. The midwifery practice of some doctors has, however, decreased, and the position in some towns is that, unless a general practitioner has a special interest in midwifery, or is of repute for his obstetric skill, his maternity practice may be largely restricted to a few medical aid calls from midwives in the course of a year. The general practitioner is often called to an emergency in the patient's home and may have to cope, without adequate assistance and in unfavourable surroundings, with critical situations which would challenge the skill of an obstetric specialist. Other calls upon his time may be pressing. Moreover, the condition of the patient may be such as to compel him to take immediate action however disadvantageous the circumstances may be. The histories of many of the maternal deaths investigated indicated that, notwithstanding these handicaps, careful obstetric procedures were adopted, but others showed that the woman's chance of recovery would often have been enhanced had a practitioner experienced in midwifery been in attendance, had the doctor been assisted by an obstetric expert, or had the patient been admitted to hospital sufficiently early.

The investigators consider that a doctor whose practice of midwifery is restricted to only a few cases each year cannot be expected to assist the midwife in difficulties which may urgently call for judgment and experience which, in the circumstances, he cannot be expected to possess. They suggest that the local supervising authority, in consultation with the local medical profession, should in future be empowered to take steps to ensure that the best local obstetric skill is made available in all cases

in which midwives are required under the rules of the Central Midwives Board to call in a doctor. Reference is also made to the need for specialist advice, and facilities for in-patient treatment, after confinement.

Much stress is laid on the value of a service of obstetric consultants, and attention is drawn to the infrequency with which the consultant facilities were utilised in some areas where they had been provided. The provision of so-called emergency units or "flying squads" in connexion with a maternity department, under the direction of an expert obstetrician, should help to reduce maternal mortality.

In the opinion of the investigators it is essential to the success of a maternity scheme that there should be coöperation between all those concerned; and, although this was a satisfactory feature in a few of the areas visited, in others its importance had not been recognised. The time for independent individual effort, they believe, is past. All persons engaged in any branch of a maternity service should consider themselves to be members of a team working towards the goal of safer motherhood. It is in this way and this way alone that effective continuity of supervision and treatment can be secured.

While there are many factors which influence maternal mortality, it is clear at least, says the report, that it is capable of reduction; and of the factors known to influence it the most important from the point of view of remedial action is the standard of midwifery practice.

THE "BONOCHORD" HEARING-AID

A NEW valve amplifier hearing-aid has been submitted to us by Messrs. Allen and Hanburys. The model examined, M.V.36, is assembled in a neat case measuring $6 \times 3\frac{3}{4} \times 3$ inches, and employs two stages of amplification, a small 36-volt dry battery and a 2-volt chargeable accumulator. The microphone is of the immersed electrode type, and a volume control is incorporated in the switch; in addition an automatic volume control is provided, which ensures that the ear will not be damaged by accidental loud noises. Tone control is obtained by the use of earpieces of various impedance, or by the employment of electrical filters. The price is 16 guineas, which includes a spare accumulator. The dry battery is said to have a life of about three months, and the accumulator to give 25 hours' use before recharging. A larger and more powerful model, M.V.52, is obtainable, with three valves, at a cost of 18 guineas. A piezo-electric crystal microphone can be fitted to either model at an additional cost of 2 guineas; this is practically free from background noise and is particularly suitable for sufferers from tinnitus and for cases of senile deafness. We think that this microphone will be advisable in most cases, as background noise is considerable in valve aids which are capable of a very high degree of amplification.

THE WHOLESOMENESS OF CANNED FOODS.—A circular written by Mr. H. B. Cronshaw, Ph.D., entitled "The Wholesomeness of Canned Foods," has been issued under the auspices of the International Tin Research and Development Council. The pamphlet contains a brief account of the history of canning and describes the premises and processes used for the purpose. The safety of canned foods as regards both chemical and bacterial contamination is emphasised and a brief review is given of recent work on the effect of heat, as applied in canning processes, and on the nutritive value of foods (including vitamins). The statements are moderate and accurate so far as the best British factories are concerned.

Births, Marriages, and Deaths

BIRTHS

CRAIG.—On April 22nd, at Fulbourn-street, E., the wife of Dr. Norman S. Craig, of a son.

DUNLOP.—On April 18th, at Tetbury, Glos, the wife of Dr. J. Leeper Dunlop, of a daughter.

JENKINS.—On April 20th, the wife of Dr. R. D. Jenkins, of Almondsbury, of a son.

LYLE.—On April 16th, the wife of Dr. Eric Lyle, Bromley, of a son.

PRICE.—On April 21st, the wife of Roy Kemball Price, M.D., of Brighton, of a daughter.

REED.—On April 10th, at Batu Gajah, F.M.S., the wife of Dr. J. G. Reed, of a son.

SMALLSHAW.—On April 20th, at Epsom Downs, the wife of Dr. D. B. Smallshaw, of a son.

STEWART.—On April 17th, at Edinburgh, the wife of Dr. James Stewart, 33, Hatton-place, Edinburgh, of a daughter.

THWAITES.—On April 20th, at Caterham, the wife of Dr. P. Thwaites, of Whyteleafe, of a daughter.

MARRIAGES

LANCASHIRE—GOODFELLOW.—On April 17th, at Bermuda, Roger William George Lancashire, Surg.-Lt., R.N., to Christina Sophia, daughter of Dr. and Mrs. T. A. Goodfellow, West Didsbury, Manchester.

MACLEAN—LOVE.—On April 15th, at Burton-on-Trent, Neil MacIntosh MacLean, M.B. Glasg., of Doncaster, to Gwyneth Duncan Love, M.B. Edin., of Tunbridge Wells.

SAVILLE PECK—JOHNSON.—On April 20th, at Madingley, Cambridge, John Portway Saville Peck, M.B. Camb., to Norah Eugenie, daughter of the Rev. M. Johnson, of Farway, Devon.

WHITEHEAD—CHAPMAN.—On April 8th, 1937, at St. Paul's Church, Mill Hill, James Edward, son of the late John Kay Whitehead, of Royton, Lancs, and Mrs. Whitehead, to Marjorie Beatrix, younger daughter of Charles W. Chapman, M.D., M.R.C.P., and Mrs. Chapman, of Highwood Coombe, Mill Hill, N.W.7.

DEATHS

ANDERSON.—On April 19th, at Erdington, Birmingham, Robert Anderson, B.Chir. Camb., Captain R.A.M.C. (T.), aged 33.

HAIG.—On April 22nd, at Woking, Francis Murray Haig, M.D. Camb.

HINE.—On April 25th, at Slapton, Devon, Thomas Guy Macaulay Hine, O.B.E., M.A., M.D. Camb., Hon. Major, R.A.M.C., aged 66.

HUNTER.—On April 18th, at Haughley, Suffolk, G. H. Hunter, M.R.C.S., D.P.H., aged 79.

MUDD.—On April 21st, at Illovo, Johannesburg, Frank Burnand Mudd, M.R.C.S., younger son of the late Dr. Barrington R. Mudd, of Storrington, Sussex.

PHILIP.—On the 23rd April, at 45, Charlotte-square, Edinburgh, Elizabeth, wife of Sir Robert Philip, M.D., F.R.C.P. (Please no flowers.)

WALDY.—On April 25th, at Darlington, C. Durham, John Waldy, F.R.C.S. Eng., aged 76.

WIDDUP.—On April 23rd, at Southsea, the home of his daughter (Mrs. Nora Blackwood), John Charles Ponsonby Widdup, late Colonial Medical Service.

YARR.—On April 24th, in London, Major-General Sir (Michael) Thomas Yarr, K.C.M.G., C.B., late R.A.M.C., of Queen Anne's Mansions, St. James's.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

UNWANTED INDICES to "THE LANCET."—Any reader who has an unbound copy not in use of the index for 1935 (Vol. I) and 1936 (Vol. I) would greatly oblige by posting the same to the Editor of THE LANCET, 7, Adam-street, Adelphi, London, W.C.2.

ST. BARTHOLOMEW'S HOSPITAL.—Overseas visitors are to be given the opportunity of "viewing" the old Priory Church and ancient hospital of St. Bartholomew's. Conducted tours have been arranged from May 7th to 14th (excluding Sunday and Coronation Day) at 11 A.M. and 2.30 P.M. each day. There will also be an exhibition in the great hall of the treasures of the hospital, of drugs obtained from the Empire, a collection of historical pathological specimens and many first editions of well-known medical works. The exhibition will be open from 11 A.M. to 5.30 P.M. daily. There will be short talks on the Hogarth painting at 4.30 each afternoon. Further information may be had from the hospital.